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M I C R O F I L M
ABSTRACTS

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Eugene B. Power

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PART I

DISSERTATIONS

THE IMPORTANCE OF GLUCOSE, ELECTROLYTES
AND CERTAIN CONSTITUENTS OF EGG YOLK
IN THE DILUTING MEDIUM
FOR THE STORAGE OF BOVINE SPERMATOZOA

(Publication No. 2885)*

Ralph Fred Kampschmidt, Ph.D.
University of Missouri, 1951

The substitution of isosmotic solutions of glucose for sodium-containing buffer solution in a medium prolongs the storage of bovine spermatozoa. With the resulting decrease in buffer solution there is a tendency for the pH to decline unless very efficient buffers are employed. The carbonate buffers: Na_2CO_3 , $(\text{NH}_3)_2\text{CO}_3$ and K_2CO_3 were almost equally satisfactory in the small amounts needed for adequate buffering. Lithium carbonate resulted in a rapid decrease in motility during prolonged storage of spermatozoa.

After meeting the minimum metabolic requirements with glucose, and the needs for adequate buffering with NaHCO_3 , the isotonicity of the medium can be adjusted by the addition of some non-electrolyte. The most satisfactory non-electrolytes were the sugars which are metabolized by spermatozoa; however, the non-metabolizable sugars, sucrose and galactose, proved to be quite acceptable substitutes.

Even with the minimum amounts of glucose and buffer present, the addition of isosmotic quantities of electrolytes instead of non-electrolytes greatly diminishes the motility of bovine spermatozoa during prolonged storage.

One of the salient features of egg yolk in the diluting medium is its ability to protect the spermatozoa from temperature shock. The egg yolk can not be altering the spermatozoa to afford this protection, since the spermatozoa again suffer temperature shock upon the removal of the egg yolk from the medium.

The lipid portion of a lipid-protein complex of egg yolk, which can be extracted in rather pure form, will protect the spermatozoa from temperature shock. Lecithin or cephalin either from egg yolk or soy beans will, in the presence of an ionizable buffer, protect the spermatozoa from rapid drops in temperature. It was shown, however, that these factors which protect against rapid drops in temperature are not sufficient for the satisfactory low temperature storage of bovine spermatozoa.

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The lipid-protein complex from egg yolk was very effective, in the diluting medium, for the prolonged storage of spermatozoa at low temperatures. In a medium containing a desirable ratio of glucose and buffer this lipid-protein complex was just as satisfactory as whole egg yolk in the low temperature storage of spermatozoa. This lipoprotein must be used fresh or without denaturation of the protein. It was impossible, by the methods employed in this investigation, to separate the lipid and protein and then recombine them to obtain satisfactory storage of spermatozoa.

AGRONOMY

A COMPARATIVE STUDY OF TOP CROSS TESTER PARENTS IN MAIZE

(Publication No. 2882)*

Clarence Orval Grogan, Ph.D.
University of Missouri, 1951

A comparative study was made of top cross tester parents in maize. The material selected for this study consisted of the segregating lines which represented high, medium, and low yield groups of (WF9 X Mo.22) (WF9), and the first segregating generations of C103 X 187-2 and A73 X N.C.7. The top cross tester parents were WF9 X 38-11, L317 X Hy, K4 X B2, L3 X G, U.S.13, and Mo.8.

The segregating lines of (WF9 X Mo.22) (WF9) were top crossed to the U.S.13 tester group (WF9 X 38-11, L317 X Hy, and U.S.13) and to K4 X B2, L3 X G, and Mo.8, which made up the Mo.8 tester group. The plot design for each tester group was a 210-item randomized block with one by five hill plots and three replications.

The segregates of C103 X 187-2 were top crossed to WF9 X 38-11, L317 X Hy, and U.S.13. The segregates of A73 X N.C.7 were top crossed to K4 X B2, L3 X G, and Mo.8. The plot design for each of these top cross tests was a 132-item randomized block with one by ten hill plots with four replications.

All of the top cross tests were conducted in 1950. Agronomic data secured from these tests included yield, root lodging, stalk lodging, and ear height grade.

This study of top cross tester parents revealed the following:

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1. Agreements between testers varied with the segregating population to which the testers were crossed.
2. There was close agreement between the average of the combined estimates of the parental single crosses and the double cross for yield, root lodging, stalk lodging, and ear height grade.
3. There was a lack of agreement between L317 X Hy and U.S.13, and between L3 X G and Mo.8 for estimates of yield performance in all top cross tests.
4. Any of the testers or tester combinations used in these top cross tests would give satisfactory information for stalk and root lodging for the segregates involved in this study.
5. Single cross testers, double cross testers, and single and double cross testers differed concerning estimates of general combining ability and concerning estimates of specific combining ability. These differences were evident with different segregating populations. A close genetic relationship between the tester and the segregates produced poor estimates of general combining ability, but good estimates of specific combining ability for that tester. Some single crosses appear to be as efficient as double crosses in estimating general combining ability.
6. The per cent of high yielding (WF9 X Mo.22) (WF9) segregates, based on total yield performance with the six testers, was greater and the per cent of low yielding segregates was less in the high yield group than in the medium yield group and in the low yield group. The parents of these segregates in the high, medium, and low yield groups were classified as high, medium, or low in total average performance by two open-pollinated varieties in previous top cross tests. This indicates the ability of these open-pollinated varieties to select lines which perform well in later generations. There were more significant correlations for yield performance in the high yield group of this previously tested material than in the medium or low yield groups.

THE DEVELOPMENT OF ANTHRACNOSE AND VIRUS 15
RESISTANT STRAINS OF RAINY RIVER NAVY BEANS
BY BACKCROSSING

(Publication No. 2709)*

Ashby Marshall Rhodes, Ph.D.
Michigan State College, 1951

The Rainy River variety of navy beans is grown extensively in some sections of Michigan. This variety has earliness and productivity together with the quality needed in the dry bean trade. Unfortunately, it is susceptible to bean anthracnose, caused by race alpha of Colletotrichum lindemuthianum (Sacc. and Magn.) Briosi and Cav., and both strains of the common bean mosaic virus, virus 1 and virus 15.

The present investigation was made to study the inheritance of resistance to the anthracnose fungus and virus 15 in conjunction with the preliminary development of disease resistant strains of Rainy River by backcrossing.

Resistance to Colletotrichum lindemuthianum was obtained from the varieties Emerson 51 and Emerson 847, both developed by the late Dr. R. A. Emerson (Cornell University). Virus 1 and virus 15 resistance came from Trag 279-1, introduced by the United States Department of Agriculture from Mexico, and Cornell 46-62, developed by Dr. H. M. Munger (Cornell University). Since the genetic factors that control resistance to virus 15 either govern resistance to virus 1 or are closely linked to virus 1, it was only necessary to test for virus 15 resistance.

Anthrachnose infection was obtained by spraying a spore suspension onto plants followed by incubation in a moist chamber for 48 hours. The spores were produced on a barley grain substrate. Virus 15 inoculation consisted of rubbing or pressure spraying juice containing the virus into the primary leaves. Carborundum powder was used as an abrasive. The juice for inoculation was extracted from virus 15 infected plants.

Inheritance of resistance to the alpha race of Colletotrichum lindemuthianum was explained by a dominant pair of genes and virus 15 resistance was interpreted in terms of two gene pairs exhibiting dominant and recessive epistasis, respectively. In crosses between Rainy River and Trag 279-1, which carries the dominant type of virus 15 resistance, several of the progeny in segregating

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generations had top-necrosis after being inoculated with the virus. These plants were shown to carry the dominant factor for resistance. Cornell 46-62 possessed the recessive type of resistance and appeared to carry a second and modifying recessive factor that induced necrosis in virus infected progeny from crosses with Rainy River.

In the breeding program, selection was made for anthracnose resistance, virus 15 resistance, non-colored stems, and earliness. Earliness was based on the number of days to first bloom. The most progress towards earliness was made from the original parental crosses and the first backcrosses. After the third backcross to Rainy River some anthracnose and some virus 15 resistant plants were allowed to segregate to obtain homozygous disease resistant strains for comparison of other characters with Rainy River. The F₂ plants and F₃ seed of these segregates closely resembled Rainy River. The sixth backcross has been completed for anthracnose resistance and virus 15 resistance, respectively. These two lines will be combined in the future and selections made from them for anthracnose and virus 15 resistant strains of Rainy River navy beans.

ANIMAL HUSBANDRY

GENETIC AND ENVIRONMENTAL CONTRIBUTIONS TO THE ECONOMIC CHARACTERISTICS OF THE MICHIGAN STATE COLLEGE DAIRY HERD

(Publication No. 2703)*

Beerappa Chandrashaker, Ph.D.
Michigan State College, 1951

Most economic characteristics of dairy cattle are inherited on a quantitative basis. That most characteristics of an individual are a complex combination of heredity and environment was first established by the work of Johannsen in 1909, through his pure line theory on beans. In studies involving quantitative characteristics, biometrics has been used as one of the means of untangling this complex and for establishing genetical relationship between individuals.

A study of the Michigan State College dairy herd was undertaken to investigate genetical relationships of economic traits,

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such as, milk yield, butterfat production and percentage of butterfat. The data used were the production records accumulated between the years 1919 to 1950, and included the five breeds, namely, Holstein, Jersey, Guernsey, Ayrshire and Brown Swiss. In all, the records of 396 cows were available. Of these there were 271 daughter-dam pairs with an average of 2.6 records per cow. All the records were converted for age, length of lactation period and times milked daily. The basis of the converted records were mature equivalent, 305 day 3X milking.

The study of the genetical relationships was divided into two parts: 1. Heritability estimates of milk yield, butterfat production and percentage of butterfat; 2. Repeatability of milk yield and butterfat production.

1. HERITABILITY

The heritability estimates were based on intra-sire regressions and correlations, and also on half-sib correlations. The estimates were pooled and a weighted average of the five breeds was obtained for each trait. These estimates are as follows: 1. Milk yield: -0.01 ± 0.08 ; 2. Butterfat production: 0.20 ± 0.08 ; 3. Butterfat test: 0.56 ± 0.05 . Although negative heritability for any trait is impossible, the occurrence of such a value could result from sampling errors and certain non-random conditions under which the records were made.

2. REPEATABILITY

Repeatability is defined as the coefficient of correlation between the records of the same cow.

Repeatability estimates were calculated from analysis of variance tables and included all the cows that made more than two records. There was a total of 789 records from the five breeds. In the present study estimates of repeatability were found to be 0.50 ± 0.269 for butterfat and 0.49 ± 0.272 for milk.

3. EFFECT OF MONTH OF CALVING ON PRODUCTION

As a supplement to the above studies, the data were also used for a study of the effect of the month of calving on butterfat production, and the sex and twin ratios in dairy cattle.

The butterfat production following calving was analysed by analysis of variance. There were a total of 332 calvings with production records. It was found that there was no significant relationship between the month of calving and production.

4. SEX RATIO

There were a total of 2063 calves born in the dairy herd during the period covered by the present study. Of these, the percentage of the male calves was 0.51 ± 0.01 which by Chi-square test was found to be not significantly different from that of the female calves.

5. TWINS

In the study of twins, data from the State Institution herds were also included. It was found that the frequency of the twins was 2.62% of the total number of calves. The study also indicated that the twins born were mostly fraternal, though one would not rule out the possibility of the occurrence occasionally of identical twins.

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INFLUENCE OF HETEROSIS AND PLANE OF NUTRITION
ON RATE AND ECONOMY OF GAINS,
DIGESTION AND CARCASS COMPOSITION OF PIGS

(Publication No. 2881)*

Keith Edward Gregory, Ph.D.
University of Missouri, 1951

The nature of heterosis effect on rate and economy of gains, digestibility and carcass composition was studied by comparing crosses with parental groups under full-feeding and also under equalized feed intake per unit live weight. The general effects of limited feeding on the expression of heterosis also were investigated.

Sixteen representative pigs were selected at weaning from 3 or 4 litters in each of 11 breeding groups. The groups represented were 2 inbred lines of Poland Chinas and 1 of Hampshires, non-inbred Durocs, their 6 crosses and Poland China linecross gilts mated to Duroc boars. Each group was divided into 2 lots of 8 pigs, equalizing sex, litter and initial weight as well as possible. One lot was full-fed and the other lot was limited-fed. The limited-fed linecross, topcross and outbred Duroc pigs received the same level of feed intake per unit of live weight as the full-fed parental inbred lines. All pigs were slaughtered at a live weight of about 205 pounds. Carcasses were evaluated from yields and scores of wholesale cuts and from dimensions indicating composition.

Within breeding groups, limiting feed intake per unit live weight to an average of 87 per cent of that under full-feeding caused no detectable change in digestibility of dry matter, reduced daily

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gain by 8 per cent, decreased feed required per unit of gain by 7 per cent and produced carcasses containing 2 per cent more lean and correspondingly less fat, and with 6 per cent higher scores for quality. However, limited feeding reduced dressing percentage enough to cancel the superiority of carcass quality so that no advantage in net carcass value per unit of live weight could be credited to limited feeding. Limited feeding did result in a marked improvement in net carcass value in those breeding groups that tended to yield the fattest carcasses, indicating that this fatness was due largely to their inherently larger appetites. The greater muscular development by the limited-fed pigs was explained by the increase of two weeks in their age at slaughter. The limited ration apparently did not retard the growth of muscle and bone.

In the full-fed linecrosses and topcrosses, hybrid vigor expressed itself in greater feed consumption (7 and 2 per cent, respectively) and in more rapid and more economical gains (23 and 11 per cent faster gain and 9 and 7 per cent less feed per unit gain, respectively); however, there were no differences in digestibility of the ration. Linecrosses between breeds gave much more rapid and more economical gains than linecrosses within breeds. The full-fed linecrosses dressed slightly higher but their carcasses contained less muscle and more fat, but no more net value than the full-fed inbreds. The full-fed topcrosses yielded carcasses with greater muscular development and less fat than the mean of the parental groups. These results indicate that heterosis manifests itself through accelerated true growth (i. e. of muscle and bone) accompanied by increased appetite and more efficient utilization of food energy.

Even when restricted to the same level of feed intake as the parental inbreds, linecross and topcross pigs gained faster (by 12 and 21 per cent, respectively) and more economically (by 9 and 19 per cent, respectively) with no difference in digestibility of the ration and very small differences in carcass composition. Compared to the mean of the parental inbred lines and outbred Durocs at the same level of feed intake, the topcross pigs gained 10 per cent more rapidly and 10 per cent more economically and showed a marked superiority in net carcass value per unit of live weight. Their carcasses contained less fat and more muscular tissue than the mean of the parental groups.

It is clear that hybrid vigor manifests itself in a greater stimulus for growth of muscle and bone and that a more efficient metabolic system permits the expression of this stimulus even without increasing rate of feed consumption. Since heterosis did not affect digestibility, it appears that this greater efficiency of crosses may consist of reduced energy losses through Specific Dynamic Action or lower maintenance requirements.

ANIMAL NUTRITION

A STUDY OF SOME FACTORS AFFECTING THE ASCORBIC ACID REQUIREMENT OF THE GUINEA PIG

(Publication No. 2739)*

William Harvey Pfander, Ph.D.
University of Illinois, 1951

A study of some factors affecting the ascorbic acid requirement of guinea pigs was made using a scorbutogenic diet from mixed grains and meals, and daily oral administrations of aqueous ascorbic acid solutions.

A total of 210 male guinea pigs, ranging in weight from 110-950 gm, and 50 female guinea pigs, ranging in weight from 180-570 gm, was used.

In a preliminary experiment involving 18 females and 23 males it was determined that about 7 weeks are needed for a good test, when the height of the odontoblasts were determined on a seven week period. In addition, determinations of hemoglobin in 160 animals, of adrenal weight in 190 animals, of adrenal ascorbic acid in 90 animals, white blood cell ascorbic acid in 75 animals, body nitrogen in 120 animals, adrenal composition in 100 animals, water intake in 32 animals, urinary excretion in 25 animals, and hemolysis time in 15 animals were made. Histological preparations of smooth, striated, and cardiac muscle, lung, kidney, liver, testis, ovary, spleen, adrenal, thyroid, and pituitary were made from healthy animals receiving a diet of grain and lettuce. Any tissues from the experimental animals which showed gross pathology were removed and compared histologically with the tissues of healthy animals. The adrenals of ten trios of experimental animals were examined in detail.

The preliminary experiments were initiated in September, 1949, and the histological examinations are still in progress. The last experiment was terminated in March of 1951.

For the determination of the requirement of the male guinea pig, the protective effects of different daily doses of ascorbic acid were observed in 34 trios ranging in weight from 110-950 gm. The food intakes of the trio mates were equalized, but the ascorbic acid supplement varied within the trio and was administered in proportion to body weight.

Eleven trios of females in groups of 5 trios each were studied. One group averaged about 200 gm initially, and the other 300 gm. One trio of 400 gm was also studied.

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Experimental hyperthyroidism was induced by feeding 6 mg iodinated casein, equivalent to 0.16 mg thyroxine, to five trios of male guinea pigs weighing about 300 gm initially.

To study the effect of hypothyroidism, 12 male guinea pigs weighing about 300 gm were placed at random in a 3 x 4 experimental block and fed equal food for seven weeks. The levels of thiouracil were 20, 40, and 60 mg/kg body weight, and the levels of ascorbic acid were 0.70, 0.62, 0.55, 0.40 mg/100 gm body weight.

Nine male guinea pigs weighing about 300 gm were placed at random in a 3 x 3 experimental block and supplied levels of 0, 2.5, and 5 mg of cortisone per day, and 0.70, 0.55, and 0.40 mg of ascorbic acid per 100 gm body weight.

The following conclusions appear justified:

1. The dietary ascorbic acid requirement of the male guinea pig weighing between 110 and 950 gm is best expressed as a function of body weight and is approximately 0.7mg/100 gm body weight per day.

2. The changes occurring in the odontoblasts of the incisor teeth are the most sensitive of the criteria studied; however, the increase in weight in the adrenal gland is also a sensitive test for ascorbic acid deficiency under controlled conditions and has the distinct advantage of being easy to determine.

3. The guinea pig does not appear to excrete ascorbic acid when receiving 0.7 mg ascorbic acid/100 gm body weight unless some metabolic disturbance occurs, as in the case of the injection of 5 mg of cortisone.

4. Unless one can find a level of plasma ascorbic acid associated with normal teeth and adrenals, determinations of blood levels are of little significance in detecting the existence of a physiological deficiency of ascorbic acid.

5. No evidence was obtained which indicates that the requirement for the female is different from the requirement for ascorbic acid for the male guinea pig.

6. The administration of a level of iodinated casein sufficient to produce a 25% increase in heart rate increases the ascorbic acid requirement about 45%.

7. A level of thiouracil of 60 mg/kg body weight does not affect the ascorbic acid requirement.

8. The only effects of 2.5 mg of cortisone per day are (a) a decrease in adrenal size and (b) a slight rise in urinary ascorbic acid. 5 mg of cortisone appeared to have an initial sparing action on the ascorbic acid requirement, but after 56 days the effect disappears and there is evidence of regressive changes in the odontoblasts.

9. Cortisone decreases both the absolute amount and the concentration of ascorbic acid in the adrenal and causes a rise in the urinary excretion of ascorbic acid.

COMANCHE LINGUISTIC ACCULTURATION:
A STUDY IN ETHNOLINGUISTICS

(Publication No. 2800)*

Joseph Bartholomew Casagrande, Ph.D.
Columbia University, 1951

Since their emergence and secession from an early Plateau Shoshone tradition the Comanche have undergone a 250 year career of marked culture change and contact with Western peoples. It is the purpose of this paper to examine the effects of this long history of contact with White culture on the Comanche language. Since language is symbolic of culture and may reflect the social and cultural conditions underlying acculturation, an attempt will also be made to show what light this linguistic evidence throws on the nature and history of Comanche culture contact.

Linguistic acculturation must be understood within the historical context in which it is set, and in terms of the grammatical resources of the language concerned. The history of Comanche contacts with Western culture shows an early period of vacillating hostile and friendly relations, largely tangential in nature, with the Spanish, French and Americans which lasted until about the middle of the 19th century. That date marked the end of Comanche tribal autonomy and ushered in the recent period of directed cultural change during which the pace of acculturation steadily increased. Structurally, Comanche is a synthetic and provides a flexible instrument well adapted to handling new cultural experiences.

While linguistic change has occurred in all aspects of the Comanche language — phonetics, grammar, and vocabulary, change has been most marked in vocabulary where changes in other spheres of culture are most sensitively reflected. Of the different forms of speech nominal forms are the most freely added. Comanche has enlarged its vocabulary to accommodate new objects and ideas by means of:

1. The extension of old meanings.
2. The coining of new words.
3. The borrowing of loanwords.
4. Translation-borrowing.

The first two methods, which use only native linguistic resources, account for 95% of the new additions to the vocabulary. Linguistic borrowing, which requires a minimal knowledge of the

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dominant language, accounts for the balance. While the effects of contact on the Comanche language have been far-reaching, Comanche has maintained its essential form and has adapted itself to new cultural experience by using its own linguistic resources rather than by extensive borrowing from alien tongues.

In addition to changes in the vocabulary, culture contact has had other concomitant effects on Comanche language and speech. Old vocabulary has been sloughed off or is obsolescent. Bilingualism prevails among the younger generations for many of whom English is now a first language. The Comanche of most younger speakers has become simplified and is affected by English speech habits. Secondary influences, such as word taboos, have also appeared. English today is the language through which one gets on in the world, but although it is doomed, the Comanche language is still the most vitally functioning part of the old culture that remains.

Linguistic evidence can be used as a valuable methodological adjunct to add a new dimension to the study of acculturation. Linguistic borrowing may indicate the provenience of culture traits and the relative effects of impinging cultures. New words may give clues to the relative age of introduced traits, indicate the comparative importance or integration of new acquisitions, or reflects attitudes toward new traits or temperamental or other psychological characteristics of a people. A series of 22 general propositions are offered as methodological leads for the general student of culture change and acculturation.

An analysis of the acculturation of Comanche names is presented in an appendix as an example of culture change in an area of culture where custom and language are virtually inseparable. From an inspection of the 2394 names on the 1940 census rolls one may trace, from the older through the younger generations, the complete adoption of the White system of patronymics and the consequent displacement of native naming practices.

DAHOMY: A PROTO-STATE IN WEST AFRICA

(Publication No. 2808)*

Stanley Diamond, Ph.D.
Columbia University, 1951

Dahomey was a society in transition from kin to civil structure. Hence, it was necessarily a society divided against itself, a society

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in conflict. The aims of the emerging State were directly antagonistic to the traditional self-sufficient ways of life practiced by the collectivities. For all significant economic, social, political, and ideological functions had been discharged within and among the joint family units, on a personal, corporate basis, prior to the Aladaxonou-Foy conquest, which set the state-building process in motion. This process consisted in the establishment of a census-tax-conscription system designed to wrest from the kin units as much of their authority and wealth as possible.

The system was basically one of internal tribute. This tribute, whether in the form of human labor, as in the case of the Amazons, or in the form of material goods, as in the case of taxes in kind on the various occupational specialists, enabled an indigenous bureaucracy to develop, and balanced them against the royal clan, while the Aladaxonou, the original war chief, emerged as the pivot between them. Although the strength of the Aladaxonou Kings was a fiction, recognized as such by the other two components of the civil power, the pseudo-patriarchal role of the Aladaxonou was essential to maintain at least a semblance of civil peace, patterned as this role was, after the symbolic functions of the joint family heads.

The Dahomean state, then, was no more than the civil power, and this power was divided into three parts, the bureaucracy, the royal clan, and the Aladaxonou. This delicately balanced partnership, ship, in the absence of any readily centralized economic means, such as irrigation agriculture, was unable to wrest the basic force of production, the extensively exploited lands from joint family control. The civil authority was, therefore, incapable of regimenting the Dahomean folk into a mature, class system, without which a true state cannot be said to exist. Dahomey, then, is a type of early or proto-State, organized by military conquest from without, and the civil power was essentially a tributary mechanism.

This civil power, lacking the means of really efficient exploitation, in the absence of a class system, of a mature internal structure organized the state as a huge compound, in imitation of local usage. It succeeded in diverting some of the strength of the folk to the support of the huge compound that was the State, but was never able to destroy the autonomy of the collectivities.

The struggle to divert the energy of the folk, to the ends of the State was reflected on every level of human behavior. Since ecological conditions prevented the ready re-organization of the society by the civil authority, the struggle was focused on the available cultural things traditionally utilized in one way by the folk, and in quite another by the State.

This work, then is offered for possible comparison with other areas in time and space in which the proto-State has developed

and either grown into the mature state through the re-organization of the means of production, or remained locked in a kin-civil conflict, with each antagonist vying for the fruits of a system of production that could not be readily changed, as in the case of Dahomey.

LAND USE IN THE RAMAH NAVAHO AREA, NEW MEXICO

(Publication No. 2830)*

John Leslie Landgraf, Ph.D.
Columbia University, 1951

This study deals with the changes that took place in the use of a small area in New Mexico by its native Navaho population between 1871 and 1941. The problem has been to demonstrate how the factors in an inclusive anthropological approach have acted to affect the observed modifications.

The area of study is called the Ramah Navaho Area. It is located just east of the Zuni Indian Reservation, defined by the spatially-oriented activities of the isolated Navaho group there. The five-hundred square mile area was connected by graded dirt roads with Gallup, Zuni, and Grants in 1941. The rough landscape, over 7000 feet in elevation, forms the headwaters of the Little Colorado River. There is a large basaltic lava flow to the south and the underlying strata are mostly of sandstone. Soils are thin. The "wild" vegetation was "pinon-juniper." Through farming and intensive grazing, sagebrush and annuals such as Russian thistle had invaded much of the land. There was considerable erosion. Semi-arid precipitation was highly variable in time and immediate locality of fall. There was snow in the winter and rainfall in the summer.

In 1941 the principal settlement was Ramah village, a small Mormon irrigated colony. Elsewhere there was a Spanish-American hamlet, trading stores, and two Federal government installations. Dwellings and fields were scattered over the entire area. In 1941 there were about 1000 residents. Half of these were "whites," including about 40 Spanish-Americans (called "Mexicans" locally). The other whites, called "Anglos" in New Mexico, included about 300 Mormons in Ramah village, about 120 "Texas people" who raised dry-farmed crops, and about thirty others who are called "outsiders" here.

This study deals with the movement into the Ramah Area of the

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three Anglo groups as a part of the larger movement of Anglo-Saxon American culture westward. In New Mexico this movement met the feudal Spanish culture in the Rio Grande valley and the aboriginal Indian cultures in the region. In the microcosm of the Ramah Area all of the groups were modified as to land-use patterns through their contacts, through their relations with geographical environment, and through the effects of the changing "outside" world.

In 1871 the Navahos had recently finished four years of captivity by the U. S. Army. Although their culture contained borrowed items, they existed largely on hunting and gathering in an organization built on matrilineal kin group "use-ownership" of resources. They had lost their war patterns and had gained a fearful respect for the Anglo whites.

The Spanish-Americans, who came while the Navahos were still in captivity, were the first invaders. From them the Navahos gained easily assimilated grazing patterns and some integration in a feudal organization. The Anglos came next, first as cattle ranchers and traders, then in the persons of the Mormons, as tightly-knit irrigation farmers. Between the Mormons and the Navahos there developed patronizing friendliness and economic exploitation on the one hand and passive animus on the other. The next comers were the Texas farmers. They came with the extension of American land laws, as homesteaders. In part they overthrew the Spanish-American culture and in some ways they provided partially assimilable farming patterns for the Navahos. The culmination of the increasing "outside" American cultural pressure was the "New Deal" intervention of the Indian Service, which acted to disrupt local organization through somewhat confusing aid to the Navahos.

In 1941 the Navahos were sheep-grazers, small-scale farmers, and unskilled wage-workers, with insufficient land-base for their economic maintenance. Their own cultural changes, however, had not kept pace with those which had been forced on the area from the outside, and even with Federal assistance they were unable to compete with the other groups for the resources of the land.

KITH AND KIN
A STUDY OF CRÉOLE SOCIAL STRUCTURE
IN MARBIAL, HAITI

(Publication No. 2840)*

Rhoda Bubendey Métraux, Ph.D.
Columbia University, 1951

This investigation of Créole social structure in Marbial, Haiti, is an examination of the pattern of social relationships undertaken to define the significance of authority in this culture. Methodologically, it is a formal structural analysis, based on the contemporary situation.

The data for the study were gathered by an anthropological field team, directed by Dr. Alfred Métraux, for a pilot project in fundamental education jointly sponsored by the Government of Haiti and UNESCO.

An analysis was made of social relationships (1) in the neighborhood (social ties in the neighborhood, affiliations through work, the formal hierarchies of the State, the Catholic and Protestant churches, etc.), and (2) in the family (the traditional family, marriage, inheritance and ownership, the kinship system). The procedure was to describe the organizational structure in terms of linked complementary and symmetrical types of relationships.

The people of Marbial are Créole-speaking peasants, who live mainly by agriculture on small owned or rented landholdings. There is no formal local community organization; the individual's principal ties to a small locality are his neighboring kin and the land on which he lives. The people are divided into a Catholic majority and a Protestant minority; celebration of the folk religion, Vodou, has been banned in recent years.

The traditional family organization is the extended, paternally related kin group, living in a cluster of households — the lakou — under the direction of the oldest man, the chèf dé fâmi. Each household holds and works its land independently, ideally reciprocally assisting one another in difficult tasks and working together for the family head. Present day fragmented family units reflect back to the traditional lakou, which also sets the tone for the behavior of kin. Both law and custom are determinants for individual practice with regard to marriage, the recognition of children, inheritance, etc. Polygyny and serial marital arrangements are common.

* Microfilm copy of complete manuscript of 363 pages, \$4.54.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A 51-577.

Kinship terms are used adaptively in the family, are extended beyond the family, and are used symbolically in situationally defined ways. Formally, the kinship system is a simple descriptive bilateral one.

Various voluntary work associations bring together the men of a neighborhood and provide agricultural labor; these are time limited by the annual agricultural seasons.

The lines of formal authority extend up out of the neighborhood. It is expected that loyalty is given to hierarchical superiors rather than to those over whom the individual exercises authority, but that benefits are owed to dependents. Personal success is achieved by individual effort and also by the assistance of superiors.

Both men and women can attain various positions of preeminence, but the main emphasis in characterizing behavior attributed to figures of authority is a masculine one.

It was found that the basic pattern of relationships is a constellation of complementary and symmetrical relations in which a superordinate individual is the key figure through whom others are linked to one another. It was found that a satisfactory description of the relationship system could be given only when the final statement included consideration of the main emphasis of the culture — which is highly individualistic — and of the complementary and symmetrical reciprocity through which social ties are maintained and given meaning.

NOCORA: AN AGRARIAN REFORM SUGAR
COMMUNITY IN PUERTO RICO

(Publication No. 2846)*

Elena Padilla, Ph.D.
Columbia University, 1951

This thesis is an anthropological study of a large scale sugar cane community in Puerto Rico where the Insular Government is the major owner of the land and where most of the population is engaged in agricultural work on the government owned farms. The community in case was chosen for study as part of a larger anthropological inquiry into Puerto Rican culture, for which purpose, four rural communities were chosen for intensive field work as samples of agricultural adaptations in the island. The main proposition of this thesis is to analyze the dynamics of cultural

* Microfilm copy of complete manuscript of 346 pages, \$4.33. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-583.

ecological processes, e. g., the interaction between the natural environment and a given technology, population resources, and ownership, control, and organization of the means of production as minimal factors conditioning the development of a cultural type. The inquiry is both a functional and historical analysis of productive processes, land use, technology, land potentials and controls, as factors conditioning the ways the population earns a living, and the relationship of these factors to the prevailing ways of life.

Nocora is one of several rural communities on the North Coast of the island where the land is primarily planted to sugar cane and operated as proportional profit farms: sugar cooperatives with the features of government management and distribution of net profits among the workers on the basis of wages earned. An overwhelming part of the population is landless and depends on selling its labor to the proportional profit farms.

The community is not a self contained entity. Its population is affected not only by the market economy, but is also subject to institutional expressions of law, power, government, and so forth. It is a class structured community and the lower class is comprised of rural wage earners who depend entirely on the community; while the other hierarchical groupings in the community, the lower and upper middle classes, are closer culturally in ways of life to comparable segments in other parts of the island, and their participation in the stream of insular life differs qualitatively. Thus the ways of life of the community are, in large part, local reflections of formal insular wide institutions; insular class structure, and of actions and instrumentalities operating outside the community. The community is thus phrased as a part of the larger socio-cultural system.

BIOGRAPHY

REED SMOOT, APOSTLE IN POLITICS

(Publication No. 2839)*

Milton Rees Merrill, Ph.D.
Columbia University, 1951

Reed Smoot, Apostle in Politics is a study of the career of Utah's most noted public figure since the days of Brigham Young.

* Microfilm copy of complete manuscript of 536 pages, \$6.70. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-576.

Smoot represented Utah in the Senate for thirty years. In that time he reached the chairmanship of the powerful Senate Finance Committee. Moreover, he achieved recognition as one of the national leaders of the Republican party. During the twenties, the years of Republican supremacy, he was in a sense the personalized epitome of dominant principles of the party — tariff protection, extreme nationalism with its avoidance of foreign commitments, and balanced budgets. Throughout the years of senatorial service Smoot held high office in an authoritarian Church. He was one of the twelve apostles of the Church of Jesus Christ of Latter-day Saints, commonly known as the Mormon Church. The examination of this dual role, one previously unknown in American politics, is a major phase of the dissertation.

This examination of the Senator is divided into nine sections. These include a brief personal biography, the background of Utah politics prior to 1902, his first election and the subsequent bitter struggle over his right to Senate place, the relationship between his joint role of Apostle and Senator, his participation in Utah politics, Smoot as nationalist, his ardent devotion to protection, his career as "watchdog of the treasury," and a final summary statement of conclusions reached in the study.

Reed Smoot had three public careers: as businessman, churchman, and politician. He entered the business world early at eighteen and proceeded to amass a considerable fortune, in Utah terms, in the next twenty-two years. He was merchant, banker, sheep man, owner of business blocks, and investor in mining properties. During his senatorial service he devoted himself largely to his political and religious responsibilities. The depression of 1929 largely destroyed his financial independence. Called to the apostleship in 1900 he continued in that capacity to his death in 1941. From 1933, when his sixth senate term ended, he was engaged solely in Church activity. Politically he moved to the eminence of Republican leadership through long tenure, untiring devotion to work, and unqualified acceptance of the principles of the conservative of the Republican party.

Smoot was first and last a loyal Mormon. He considered that his major political function was to protect the Church and advance its cause. He regarded the attempts to remove him from the Senate as an attack upon the Church. A son of polygamy he was himself a monogamist. To his mind his role was to reestablish the Mormon people as an integral unit in the American Commonwealth. His victory in the Senate largely ended Gentile attacks on the Mormons and confirmed monogamy as the marriage practice of the Church.

Ecclesiast though he was, Smoot was an astute politician. In his early senatorial years he created a powerful party machine in

Utah which dominated the political life of the state for more than a decade. Though the purpose of the machine was the defense of the Church, and the enhancement of the power and reputation of Reed Smoot, the Apostle-Senator did not disdain the use of the methods of the successful practical politician. Torn by internal feuds and the personal popularity of Woodrow Wilson the Smoot machine disintegrated in 1916. From that time forward he relied on his national reputation and the general prosperity of the twenties for his own political survival.

Smoot was an intense nationalist. Americanism was a religious concept to him. The country had been founded under the watchful eye of the Deity and its institutions were created and developed by inspired men. Political collaboration with other countries was to be avoided under all circumstances.

No legislator was more convinced of the desirability of tariff protection than Reed Smoot. He entered the Senate a protectionist, he left the Chamber proudly flaunting the banner of the ill-fated Smoot-Hawley Act. In his opinion it was his greatest single legislative achievement.

Year after year Smoot pleaded and fought for economy in government. The treasury had no greater friend than the Mormon Apostle. Waste, personal or governmental, horrified him. He attacked and criticized useless expenditures, whether small or large, and he gave major support to the establishment of the executive budget system and the abortive reorganization programs.

At the end he was defeated at the polls, his personal financial security crumbled, his influence in the Church was minimal, and practically every one of the political principles he cherished was modified or overthrown. Grimly he held to his beliefs. Men might be weak, but Mormon theology and his version of Republican doctrine remained two solid rocks, complementing each other perfectly.

MEXICAN APOSTLE THE LIFE OF FRANCISCO I. MADERO

(Publication No. 2854)*

Stanley Robert Ross, Ph.D.
Columbia University, 1951

The reign of Porfirio Díaz was the political and economic miracle of nineteenth century Mexico. Attracting and conciliating

* Microfilm copy of complete manuscript of 509 pages, \$6.36.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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contending elements and eliminating objects of contention, Díaz created a situation of relative peace and material progress. However, the mass of the Mexican people was not a party to the compromise and did not share in the benefits. Loss of political freedom, generalized tyranny, extended rural feudalism and superimposed capitalism contributed to a rising tide of discontent.

The interview granted by Porfirio Díaz to James Creelman in 1908 unleashed a revival of political activity. Newspapers, books, and folios were published, and political parties were organized. Francisco I. Madero (1873-1913) contributed to this political agitation. The eldest son of a wealthy, landowning family, Francisco, spurred by an intense, mystical idealism entered the political arena to oppose the prolongation of the system of absolutism and to promote political democracy as the means to progress and a better life for the Mexican people. Building on the efforts of the earlier liberal movement of Flores Magón and the political efforts of the supporters of Bernardo Reyes, Madero energetically and courageously worked to arouse popular sentiment and for the organization of an opposition political party. His book, *THE PRESIDENTIAL SUCCESSION IN 1910*, contributed significantly in this respect and projected the author into national prominence. Through correspondence, articles, and extensive campaign trips Madero proved a competent political organizer and earned the title "apostle of democracy." When the government turned the full force of its system of oppression against the Madero group and the hope of compromise faded, Madero moved first to direct opposition to the reelection of Díaz and then, reluctantly, to revolution.

For Madero revolution was an ultimate means to achieve the political change which the electoral campaign was unable to accomplish. Madero continued the campaign for the presidency until his arrest in order to provide legal justification and to create a favorable climate of opinion for the armed movement. Under the Plan of San Luis Potosí the Madero movement started inauspiciously. It resembled a political riot. Initial reverses discouraged senior members of the Madero family, but Francisco continued to hope for better days. The armed movement, kept alive in Chihuahua by Pascual Orozco and aided by strict American neutrality, finally triumphed at Ciudad Juárez. The defeat was the coup de grace for the disintegrating Díaz regime. However, the Treaty of Ciudad Juárez was a transaction and not a victory. The interim government of a de la Barra was a grave political error.

The revolutionary camp had not been integrated. Its forces were to be discharged. During the interregnum the elements of the revolution divided while the forces of the old regime regrouped and became entrenched. The federal army remained formidable. Madero triumphed in the 1911 presidential elections, but he found

himself caught between the distrustful revolutionaries and the bitter supporters of the Díaz system. Confident and optimistic Madero strove to apply his democratic principles in an unpropitious environment. Education was supported, labor enjoyed a favorable milieu and an effort to solve the agrarian question was initiated. However, the disturbed conditions, the opposition press, the effective technics of congressional opponents and the efforts of influential groups handicapped the administration. Four rebellions, led by Zapata, Bernardo Reyes, Orozco, and Felix Díaz, absorbed the energies and resources of the Madero government. Finally, the Ciudadela rebellion aided by military treachery and abetted by the American Ambassador overthrew Madero's regime.

Madero's assassination was regarded as a blow to the revolution, and his martyrdom succeeded in uniting the revolutionists under one banner for the next phase of the social and economic upheaval.

BIOLOGICAL CHEMISTRY

THE FREE AMINO GROUPS OF SERUM ALBUMINS

(Publication No. 2865)*

Helen Van Vunakis, Ph.D.

Columbia University, 1951

The reaction of dinitrofluorobenzene with free amino groups has been used to identify the terminal amino acids in crystalline preparations of human, bovine and horse serum albumins and human γ -globulin.

The albumins of all three species contain one terminal amino group indicating that the molecule is made up of one main peptide chain. Aspartic acid is the terminal residue in each case but whether this occurs free or as the amide cannot be determined. This is the first instance that an amino acid with a polar side chain has been found in the terminal position in a protein. The ϵ -amino groups of lysine reacted completely with dinitrofluorobenzene.

Human γ -globulin was found to contain at least seven terminal amino acids in fractional amounts suggesting that the preparation analyzed consists of a number of molecules with similar physicochemical properties but different terminal amino acids. The

* Microfilm copy of complete manuscript of 53 pages, \$1.00. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-601.

ϵ -amino groups of lysine were not all available for reaction with dinitrofluorobenzene either in the native protein or after heat denaturation.

The significance of these observations is discussed in relation to the structure of the proteins.

THE ISOLATION AND CHARACTERIZATION OF AN ACIDIC PROTEIN FRACTION OF RAT LIVER NUCLEI

(Publication No. 2904)*

Tung-yue Wang, Ph.D.

University of Missouri, 1951

Mayer and Gulick first reported an acidic protein precipitated at pH 5.8-6.15 from calf thymus nuclei. Subsequent investigations by Thomas, Mayer and their associates have indicated the presence of this acidic protein in ram and boar spermatozoa, rat liver nuclei and chicken erythrocytes. A similar acidic protein, found in the nuclei of cod sperm, ox spleen, and rat carcinoma has been reported by Stedman and Stedman and named "chromosomin." An acidic protein was also obtained from the nuclei of rat and human liver, rat carcinoma and calf thyroid by Zbarskii and Debov. These protein fractions can roughly be compared with Mirsky and Pollister's "residual protein." The evidence has thus been established that besides basic proteins and nucleic acids present in the cell nucleus, there is an acidic protein component, which may contribute to the chromosomal structure and function. The knowledge of this acidic protein has thus far been confined to its presence in the cell nucleus; very little has been reported concerning its characteristics and possible functions. The present investigation was undertaken to study some characteristics of this acidic protein fraction as isolated from rat liver nuclei.

Cell nuclei were isolated from male rat livers by both Behrens' technique and a modified Dounce citrate method. The nucleoproteins were removed by extracting the nuclei exhaustively with 1 M sodium chloride. The acidic protein fraction was then obtained by extracting the residue with 0.1 N sodium hydroxide followed by isoelectric precipitation with glacial acetic acid. It gave positive protein tests. Quantitative estimation showed that this acidic protein fraction represented 49.3% of the total nuclear mass. The extraction with alkali still left a residue, representing 13.5% of the

* Microfilm copy of complete manuscript of 131 pages, \$1.64. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-640.

nuclear mass, which was protein in nature but unextractable by any of the solvents tried.

Study of this acidic protein fraction indicates that it contained roughly 10% lipids. The lipids were so firmly attached to the protein moiety that neither repeated precipitation and solution nor shaking its alkaline solution with ether would alter the lipid content. These properties strongly indicate that it is a lipoprotein complex. Qualitative analyses of the lipids gave positive phosphorus, cholesterol and neutral fat tests.

That this protein fraction has more than one component is shown by solubility tests at pH 10.17 in sodium hydroxide-glycine buffer and at pH 7.5 in phosphate buffer, although electrophoretic patterns obtained at pH 7.5-7.8 showed it to have only a single component. Titration curves gave its approximate isoelectric point at 5.6.

The arginine, tyrosine and tryptophane contents of this acidic protein complex, as determined by chemical methods, were 5.74%, 3.2% and 2.9% respectively. Paper chromatography established the presence of the following amino acids:

| | |
|------------------------|---------------|
| leucine and isoleucine | cystine |
| tyrosine | histidine |
| methionine | alanine |
| valine | glycine |
| proline | glutamic acid |
| hydroxyproline | aspartic acid |
| threonine | arginine |
| serine | lysine |

Elementary analyses gave

| <u>carbon</u> | <u>hydrogen</u> | <u>nitrogen</u> | <u>phosphorus</u> | <u>ash</u> |
|---------------|-----------------|-----------------|-------------------|------------|
| 46.80% | 7.11% | 14.5% | 0.26% | 3.86% |

This acidic protein complex, as obtained by alcohol precipitation, gave a crystalline X-ray diffraction pattern. However, whether this crystalline precipitate is composed of exactly the same material as that obtained by isoelectric precipitation is not known; nevertheless, the former showed positive protein tests and when it was brought into 0.1 N sodium hydroxide solution and acetic acid added slowly to the solution, it precipitated isoelectrically at near pH 6.

That the acidic protein fraction contributes to the nuclear structure was clearly shown by the disappearance of the nuclear structure after sodium hydroxide treatment, but its biological role in the cell awaits further investigation.

ANATOMY OF WOOD AND BARK IN THE RUBIACEAE

(Publication No. 2870)*

Ying-Pe Chang, Ph.D.

University of Michigan, 1951

The present study deals with the wood anatomy of 101 species in 36 genera of the Rubiaceae and with the bark anatomy of 51 species in 23 genera. Material was obtained from various sources in both hemispheres, but primarily from Professor H. H. Bartlett's collection from Sumatra. In addition to determining the fundamental cell types and diagnostic features, information has been obtained on: 1. The basic anatomical characteristics of bark and their correlation with secondary xylem. 2. Structural relationship of scandent and erect forms. 3. The bearing of stem anatomy on the relationship of the Rubiaceae and the evidence bearing upon the conception that the Rubiaceae are a natural group in the evolutionary sense.

Cell types, and especially the transitional forms which occur in rubiaceous wood are discussed. Some of their interesting features are as follows: 1. The diversified perforations in vessel elements. 2. The presence of thin-walled tyloses associated with gummy substance in vessel elements. 3. The total variation and common occurrence of tracheids in the Rubiaceae and other families, leading to a broadening of the category. 4. The transitional forms of tracheids with perforations. 5. Septations in tracheary cells. 6. Modifications of cell walls such as striations in vessel elements and helical sculpturing in fiber-tracheids. Use of the following diagnostic features is suggested for separating the systematic small groups: 1. Four types of xylem rays, especially based upon their multiseriate portions. 2. Three types of parenchyma. 3. Two types of fibers and the ratio of length of fiber to vessel element. 4. Extreme variation range of pore size and arrangement.

Study of bark anatomy was confined to the periderm, cortex, and secondary phloem. Cell types in each tissue are discussed. Sieve-tube elements and sclerenchyma are specially emphasized for both histological interest and diagnostic value. The basic patterns of bark are evaluated and illustrated by diagrammatic drawings. Bark structure in each genus shows significant characteristics which are constant among the species studied. Although the physiological functions in bark tissues are different from those in wood, there are some anatomical correlations between them. The

* Microfilm copy of complete manuscript of 374 pages, \$4.68. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-606.

combined features of secondary xylem and bark provide the most reliable data for identifying woods and for determining botanical relationships.

The anatomical characteristics in the scandent stems differ significantly from those in the erect forms only in the size of pores and in the length of tracheary cells and fibers. Other features generally show no fundamental difference, even including the ray composition and the length ratio of fiber to vessel element. These facts reveal the close affinities of the scandent and erect forms which commonly occur in the same genus of rubiaceous woods. A correlation of short and broad vessel elements with the climbing habit may support the hypothesis of climbers being more advanced than the erect forms, but a single anatomical feature should not be over-emphasized. Climbing is of recent origin in various lines of descent, and of no great evolutionary significance in the group as a whole, for the same natural genera contain upright and climbing species.

In the anatomical features of their secondary xylem, the woody Rubiaceae present an unusually unified structure for such a prolific family. The basic similarities of anatomical characteristics support the view that this group of woods is naturally classified. From the phylogenetic viewpoint the stem of rubiaceous woods as a whole could be considered as in the stage of moderate specialization which seems not to parallel the advanced morphological features of their sexual organs. According to data from limited material, woods in the subfamily Coffeoidae, especially in the tribe Psychotrieae, are comparatively less advanced and more diversified than those in the subfamily Cinchonoideae. The bearing of wood structure on relationships within Rubiaceae and to other related families such as Caprifoliaceae, Compositae, Cornaceae, Loganiaceae, and Verbenaceae, is discussed.

STUDIES ON CHEMICAL METHODS OF AQUATIC PLANT CONTROL IN FRESHWATER LAKES AND PONDS

(Publication No. 2708)*

Norman Oley Levardsen, Ph.D.
Michigan State College, 1951

Aquatic plants, when they become so abundant that they interfere with the recreational use of lakes and ponds, are considered a

* Microfilm copy of complete manuscript of 149 pages, \$1.86.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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nuisance. The present study on chemical methods of aquatic plant control has been made as a result of increased interest in water weed problems.

The control of submerged aquatic plants with nigrosine dye did not prove entirely successful. The purpose of putting nigrosine into the water was to so darken it that the plants would be unable to manufacture additional food because of a lack of light and would soon use up their reserves. In trials at a 17 acre lake and a .75 acre hatchery pond, the dye did not remain long in solution. It was determined by laboratory study that the disappearance of the dye could be attributed to salts in the water which caused the dye to be precipitated as an insoluble salt. At the hatchery pond a decrease in dissolved oxygen and a corresponding increase in carbon dioxide followed applications of the dye. Further work is required before definite conclusions can be made in regard to the value of nigrosine in aquatic weed control.

Trichlorbenzene and xylene both have herbicidal properties when sprayed beneath the surface but they require a large percentage of emulsifier to maintain the emulsion in contact with the plants for the desired period of time. When trichlorbenzene and xylene are mixed in the proportion of 1:3, this mixture is near the specific gravity of water. The method thus makes it possible to utilize these materials which, by themselves, would be either too heavy or too light but when balanced and emulsified remain in suspension for a longer period.

Pellets of either 2,4-D or 2,4,5-T did not control submerged weeds when distributed on the bottom of shallow water at concentrations considered to be practical. Pellets composed of 2,4-D and pentachlorophenol were effective and rapid in action.

The translocated herbicides were found to be superior to contact herbicides in the control of floating and emergent aquatic plants. Rootstock reserves were sufficiently high so that even when the exposed vegetative growth was killed with a contact spray, regrowth occurred. When translocated herbicides were utilized, best control was obtained when applications coincided with the first appearance of flowers. Some species required repeat applications when regrowth became established.

THE HISTORY OF GROUP INSURANCE AND RETIREMENT PLANS IN THE UNITED STATES

(Publication No. 2822)*

Louise Wolters Ilse, Ph. D.
Columbia University, 1951

The spectacular transformation of the United States, within less than a century, from an agrarian nation into the greatest industrial power in the world, brought with it far reaching changes in our social and economic life. Perhaps most significant, the majority of our people became dependent for subsistence mainly upon the paycheck they earn in industry, so that an interruption of earnings through illness, injury, old age, or death often brought distress, sometimes financial disaster to the industrial family. Recognition of the need for protecting the paycheck against such hazards brought about the development, in 1911, of a new form of insurance, Group insurance, covering employees of an employer, without medical examination, under a blanket policy. Group Life insurance was the first kind of Group insurance issued, providing a year's pay or more upon the death of an employee.

Several years later Group Accident and Health insurance, providing a weekly indemnity of a portion of the employee's pay in event of illness or accident, made its appearance. This was followed by Group Accidental Death and Dismemberment insurance, and, in the middle 20's, by Group Annuity or insured pension plans. During the course of the 30's Group Hospital Expense insurance and Group Surgical insurance were developed for the employee, and later extended to the employee's dependents. Group Medical Expense insurance for employees and their families came in the 1940's. At the present time over twenty million employees are covered for an average amount of \$ 2,000 under Group Life insurance policies; over ten million are insured under Group Accident and Health contracts; seven million have Group Accidental Death and Dismemberment insurance; over eight million workers and nine million dependents are protected by some form of Group Hospital, Surgical or Medical Expense insurance. More than two million employees are included in insured pension plans.

Group insurance experienced its greatest growth since World War II as a result of union bargaining on welfare benefits. Before that time the initiative for such plans had come from management, spurred on by the insurance companies who saw the need for

* Microfilm copy of complete manuscript of 498 pages, \$6.23.
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employee protection and formulated the instruments for serving that need.

The important role played by Group insurance in the general economic scene is indicated in the claim payments made during the year 1949. Almost \$ 259,000,000 was paid under 123,000 Group Life insurance claims. Statistics on the number of Health insurance claims are unavailable, but the total sum paid was \$ 353,000,000. Under Group annuities the seven leading insurers paid an annual income of \$ 62,000,000 to holders of 107,000 certificates. Through such payments the country's economy is aided, for in some instances they represent the difference between the adequacy of family resources and the necessity for turning to the community for financial help. From a social standpoint the effect of receiving benefits as a contractual right, rather than a charity through the "pass the hat" method, is undeniable in terms of enhanced human dignity. In a more general sense Group plans are of economic benefit because investment of the insurance premiums collected serves to support the national economy and stimulate private enterprise.

The Group insurance movement is an American version of the governmental social insurance programs established abroad, fitted within the framework of the American private enterprise system. Its tremendous growth within less than half a century, not only in number of employees covered but in variety of services rendered is an impressive manifestation of how American industry has adapted its institutions and rules of conduct to take account of the human equation in the new technology.

THE ROLE OF ACCOUNTING IN GOVERNMENT

(Publication No. 2732)*

Robert Minor James, Ph.D.
University of Illinois, 1951

Generally, democratic government exists to perform those services which the people consider it better qualified to render than any individual or private group of individuals. As such it is subject to economic laws and the marginal analysis. The systematic effort to reform public administration is relatively new and includes modern fiscal procedures including budgeting.

Governmental accounting includes the areas of accounting, budgeting, auditing and cost accounting. It gathers, arranges,

* Microfilm copy of complete manuscript of 520 pages, \$6.50. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-473.

summarizes, verifies, and communicates financial information. Accounting is a controllable and reliable device with certain limitations on its capacity to transmit information. It must have an adequate body of theory, able personnel, good records and systems for their maintenance, and a demand for the information which it can communicate.

The relationship between governmental accounting and government rests primarily on the power of communicating financial information which governmental accounting possesses and on the need for that information by government. This relationship is studied through an analysis of the functions of government and the nature of the demand of each for accounting information. These functions are the determination, execution, and evaluation of policy.

The function of determining policy is composed of three sub-functions: 1) the discovery and description of a need for a consideration of policy and the proposals for satisfying this need, 2) the considerations of these proposals, and 3) the decision between these proposals. Accounting records can serve as a background of information for reference in the performance of this function while budgetary procedure outlines the manner of performance. The role of accounting in this function is significant in that the accounting and budgeting processes are in large measure the means of communicating facts and opinions in an intelligible manner between the agents of government who take part in this function.

The function of executing policy is composed of four sub-functions: 1) determination of the work required, 2) determination of who is to do the work, how and when it is to be done, and the delegation of the requisite authority and responsibility, 3) performance of the work, and 4) supervision and control of the work. The value of accounting to all four of these sub-functions depends on its ability to gather, digest, and communicate information which is needed to those who need it. This information must deal with what is intended and what is actually done. In this manner, intention as expressed in the determination of policy can be executed.

The function of evaluating policy is composed of three sub-functions: 1) verification of what has actually taken place, 2) determination of the variances between what was planned and what actually took place, the causes of these variances, and the consideration of their legality, desirability, preventability in the future, and the like, and 3) overall evaluation from the point of view of hindsight. The audit is a vital part of the first sub-function. The role of accounting in the evaluation of policy is primarily that of recording, organizing, verifying and transmitting information which is needed to those who are to evaluate policy.

The journals and ledgers, budgets and budgetary accounts, fund accounting, accrual accounting, cost accounting and performance

budgeting, standards of service and cost, auditing, and the reports and statements of accounting can assist in all of the functions of government by gathering, organizing, verifying, and communicating reliable information of a financial character. Although accounting is not the only source of information available to government, it is the major source of financial information. Accounting in theory and practice may differ. Accounting must accept a heavy responsibility for informing the public and creating citizen interest in government.

CHEMISTRY

THERMODYNAMIC FUNCTIONS AND KINETICS
OF THE UREASE-UREA SYSTEM

(Publication No. 2873)*

John Walter Barger, Ph.D.
University of Missouri, 1951

The urease catalyzed hydrolysis of urea was studied at several temperatures. In a study of the effect of the hydrogen ion concentration upon the rate of hydrolysis, the urease appears to be acting as a weak acid. The ionized urease is considered to be the active form of the enzyme catalyst.

The rate of the urease hydrolysis of urea was measured as a function of time and of urea concentration. The experiments were also performed at several different phosphate buffer concentrations. The rate of hydrolysis was found to be a logarithmic function of the buffer concentration. The values of this function were plotted against buffer concentration and the rate of hydrolysis was determined at zero buffer concentration. The four temperatures used in these experiments were 20°C., 25°C., 30°C., and 35°C. The data indicate that the first step of the mechanism is the formation of an inactive complex between the urease and urea. The second step in the mechanism is the formation of an activated complex between the inactive complex and water. The final step is the decomposition of the activated complex to form ammonium carbonate and urease.

The thermodynamic functions were calculated from the rate data for each step of the proposed mechanism. The free energy of

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activation of the urease and urea is 9.2 kcal. at 20°C. The free energy for formation of the inactive complex is -1.98 kcal. at 20°C. The free energy of activation of the inactive complex is 11.1 kcal. at 20°C. The entropy of activation of the urease and urea is 8.55 E. U. The entropy for the formation of the inactive complex is 17.0 E. U. The entropy of activation of the inactive complex is -8.47 E. U. The heat of activation of the urease and urea is 11.7 kcal. The heat for the formation of the inactive complex is 3.0 kcal. The heat of activation of the inactive complex is 8.7 kcal.

The values of the Michaelis-Menten constant were calculated from these thermodynamic data at each temperature. The values of these constants were found to be 0.033 at 20°C., 0.030 at 25°C., 0.028 at 30°C. and 0.026 at 35°C.

THE EFFECT OF TEMPERATURE AND pH ON THE OPTICAL ROTATION OF PROTEINS AND AMINO ACIDS

(Publication No. 2880)*

Morton Allan Golub, Ph.D.
University of Missouri, 1951

The effect of temperature and pH on the optical rotation of a representative group of proteins and amino acids has been studied. The differences in optical activity between the native and denatured states of proteins were also investigated.

It has been shown that although the amino acids generally possess moderately large temperature coefficients of optical activity, the proteins, in those cases where denaturation does not occur, display little or no change in rotatory power with changes in temperature. An explanation of these results in terms of the modern theory of optical activity is offered.

It has been found that denaturation of a protein is always accompanied by increased optical activity, and a possible explanation of this effect is suggested.

The shapes of the optical rotation-pH curves obtained for a number of amino acids were interpreted from the standpoint of a knowledge of the polar groups present in the molecule. It is seen that an estimate of the partial rotation contributions of various particular acidic and basic groups found in amino acids to the total molecular rotatory power may be made with the help of these curves.

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The shapes of the optical rotation-pH curves obtained for proteins were found to reflect the presence of free acid- and base-combining groups in the protein. It has also been shown that these curves are capable of furnishing information about the extent of intramolecular salt or amide formation.

In those cases where the protein undergoes denaturation in acid or alkaline media, the use of rotation-pH curves as a form of "polarimetric titration" of the native protein is proposed.

THE ACTION OF NITROUS ACID ON ALICYCLIC AMINES III

(Publication No. 2887)*

Jack Dean Kerr, Ph. D.

University of Missouri, 1951

2-Phenyl-, 2-cyclohexyl-, 4-phenyl-, 4-cyclohexyl-, 4-tert.-butyl-, and 4-methylcyclohexanone oximes have been prepared and reduced with sodium and ethanol to the corresponding trans cyclohexylamines. The amines have been characterized by their hydrochloride and benzoyl derivatives. The reduction of 4-phenyl- and 4-tert.-butylcyclohexanone oximes with Raney nickel also led to the corresponding trans cyclohexylamines. The reduction of 4-tert.-butylcyclohexanone oxime with platinum oxide catalyst in glacial acetic acid or with palladium on charcoal catalyst has not led to the expected pure cis cyclohexylamine.

Maienthal prepared a 2-phenylcyclohexylamine by the reduction of 1-nitro-2-phenyl-4-cyclohexene with Raney nickel. This 2-phenylcyclohexylamine is identical with the trans-2-phenylcyclohexylamine prepared by the reduction of 2-phenylcyclohexanone oxime with sodium and ethanol.

trans-4-Phenyl-, trans-4-cyclohexyl-, trans-4-tert.-butyl-, and trans-4-methylcyclohexylamines were reacted with nitrous acid according to the Demjanov reflux method and 52% trans-4-phenyl-, 49% trans-4-cyclohexyl, 55% trans-4-tert.-butyl-, and 60% trans-4-methylcyclohexanols were isolated as the only product of each reaction. The trans cyclohexanols were also synthesized by reduction of the corresponding cyclohexanones with sodium and ethanol.

When trans-2-cyclohexylcyclohexylamine was reacted with nitrous by either the Hückel diazotization or the Demjanov reflux methods, the product (trans-2-cyclohexylcyclohexanol) was

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accompanied by an olefin of the empirical formula $C_{12}H_{20}$. The presence or absence of the expected rearrangement product (cyclohexylcyclopentylcarbinol) has not been shown.

FREE CLOUD APPROXIMATION TO MOLECULAR ORBITAL CALCULATIONS

(Publication No. 2845)*

Gertrude Fanny Neumark, Ph.D.
Columbia University, 1951

A method of "free" clouds, i. e. clouds whose centers can be moved at will, has been suggested as an approximation to molecular orbital calculations. These clouds are, for simplicity, assumed spherically symmetric.

Two types of these clouds have been considered in detail. One has Gaussian error functions as wave functions. In the other, the potential energy integrals are evaluated by considering finite clouds of uniform charge density, the kinetic energy being obtained by the Uncertainty Principle.

Both types were tested on the hydrogen atom and molecule, on singly ionized helium, and on the helium atom. The results were quite satisfactory, especially considering the ease with which they were obtained.

Applying these methods to more complicated systems, it would be mathematically desirable, though not essential physically, to use orthogonal functions. This can be accomplished for the Gaussian method by the standard Schmidt process. Thus, for example as a 2s function, one can use $r^2 \exp(-r^2/R^2) - \alpha \exp(-r^2/R^2)$, where α is the orthogonalization coefficient. This method is illustrated for the first excited state of the hydrogen atom. Very good results were obtained for this case. However, it is apparent that this method gets tedious mathematically.

The uniformly charged cloud method, on the other hand shows great promise of simplicity. If electrons of the same spin are not allowed to overlap, not only are the functions automatically orthogonal, but the electron-electron exchange integral vanishes as well. Carbon and its hydrides, and a system of three hydrogen atoms have been treated by this method. The results for the carbon hydrides were not very satisfactory. One obtains a bond energy for methane of 2.23 E. as against 0.67 E. observed.

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On closer analysis, the above result is not surprising. If one calculates the limiting energy as two Gaussian clouds approach each other, one finds that for hydrogen-like clouds, for complete overlap the energy for electrons of parallel spin is only 0.1 E. higher than for those of opposite spin. Thus, under the attraction of sufficient positive charge two concentric clouds will be stable, even for electrons of parallel spin. Since a similar situation can be expected for uniformly charged clouds, the assumption of no overlap for electrons of parallel spin does not appear too good.

In view of this likelihood of overlap, approximate expressions have been obtained for the resultant exchange integrals of the uniformly charged cloud method. These expressions are based on replacing the overlap region by a sphere of equal volume.

The energy of (1s) (2s) ^3S helium has been calculated, using concentric Gaussian clouds. The fact that a good result was obtained is a further indication of this tendency toward overlap.

DAIRY HUSBANDRY

STUDY OF PITUITARY-THYROID INTERRELATIONSHIP INVESTIGATED BY RADIOACTIVE ISOTOPIC METHOD

(Publication No. 2884)*

Kuang-mei Hsieh, Ph.D.
University of Missouri, 1951

An attempt has been made, by the use of radioactive phosphorus, to establish a simple procedure that can be used as a new sensitive assay method for thyrotrophin.

Day-old New Hampshire chicks were used throughout the research work because the chicks were readily obtainable, easily handled and the thyrotrophin concentration was low. When 10 μC of P^{32} were given to each day-old chick intraperitoneally, the thyroid gland demonstrated a constant exchange of radioactive phosphorus which reached its maximal within 30 minutes and then declined as time advanced.

Administration of thyrotrophin caused a stimulation of cellular activity in the thyroid gland. The specific activity (the ratio of the uptake of P^{32} and the total orthophosphate content) of the thyroid after a single intraperitoneal injection of one Bergman-Turner

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chick unit of thyrotrophin reached its maximum six hours after the administration of the hormone. When doses of thyrotrophin varying from 0.0125 to 4.0 units were administered, the maximal effect, as measured by the specific activity, was obtained by 0.75 units. When larger amounts of thyrotrophin were given the specific activity was diminished. This effect was interpreted as indicating that iodine can affect the thyroid parenchymal cells directly and that elementary iodine (or its equivalent) is formed and inactivates the thyrotrophin to produce an inert iodoprotein. However, in the data for this experiment the weight of the thyroid gland increased with increasing dosage of thyrotrophin.

The measurement of the radioactive phosphorus uptake in the thyroid gland of day-old male New Hampshire chicks is thus suggested as a sensitive method for the assay of thyrotropic hormone. A chick unit of thyrotrophin was defined as that amount of the hormone, which, when given intraperitoneally to day-old male chicks, will cause in six hours a fourfold increase in the specific activity when compared with normal controls, as shown by the injection of 10 μ C of P^{32} , 30 minutes prior to sacrifice.

In under-fed chicks, a reduction of endogenous thyrotrophin secretion and an inactive thyroid gland were demonstrated. However, the thyroprotein treatment caused a greater reduction of endogenous thyrotrophin than did the underfeeding. An elevation of the orthophosphate content of the thyroid was shown to parallel the amount of thyrotrophin given.

Thiouracil feeding definitely stimulated the discharge of thyrotrophin from the chick's pituitary when measured by the radioactive phosphorus uptake method. The highest concentration of thyrotrophin was demonstrated in the pituitaries of 14-week-old chicks fed 0.1 per cent thiouracil in a ration for only one day. However, the concentration of thyrotrophin in the thiouracil-fed females was higher than in males. The pituitaries of chicks fed for three days on this ration showed a slightly lower concentration of thyrotrophin.

The pituitaries of both sexes of growing White Plymouth Rock chicks were tested for the concentration of thyrotrophin. Fourteen-week-old White Plymouth Rock chick pituitaries showed a higher concentration of thyrotrophin than did the pituitaries of younger chicks. The concentration of thyrotrophin in male pituitaries was higher than that of female pituitaries. The concentration of thyrotrophin in day-old chick pituitaries was lowest.

The weight of the thyroids, the uptake of P^{32} and the content of orthophosphate fluctuated with seasonal changes. The largest thyroids were observed in the winter and smaller thyroids were found in the summer. The uptake of P^{32} was high during the early winter whereas the orthophosphate content was low and the uptake of P^{32} was least during the warmer months.

NUTRITIONAL REQUIREMENTS IN HYPERTHYROIDISM

(Publication No. 2892)*

Mohamed Abdel-Baki Maghrabi, Ph.D.

University of Missouri, 1951

The thyroid gland, as a regulator of body metabolism, has been a center of attraction for research workers. A cure for hypothyroidism was achieved by the use of thyroidal substances. However, in hyperthyroidism the answers to many problems associated with that condition were not easy to approach. Partial surgical ablation of the thyroid gland and the use of antithyroid substances have been advocated.

Through recent advances in the knowledge of interrelationships between thyroid function and metabolism of the vitamins, correction of the abnormal condition through better nutrition was visualized. In hyperthyroidism the amounts of several of the known vitamins, in body tissues, appear to be subnormal. Furthermore, the group of B-vitamins and other vitamins are constituents of enzymes involved in fundamental physiological processes, especially those concerned with energy transformations. As a result of hyperthyroidism, the enzymatic activity is decreased below normal. Addition of several of the known vitamins has been claimed to alleviate symptoms associated with hyperthyroidism and to reestablish the activity of the enzymes. Consequently, the increase in the metabolic rate and the loss in weight may be avoided.

Some substances have been reported to possess growth stimulating factor(s), such as liver, yeast, animal protein factor, and a number of antibiotics. Most of these materials were found to be of value in experimental hyperthyroidism.

The induction of hyperthyroidism, by the feeding of thyroactive materials (e.g. thyroprotein), has been used in animal experimentation. Some reports have shown that feeding thyroprotein will stimulate the processes of growth, milk and fat production, and egg production. Evidence for the need of additional nutrients in this condition has been accumulating in the literature.

The present work was undertaken to investigate the effect of thyroprotein feeding on growing chicks and the possibility of meeting the nutritional requirements of the hyperthyroid animal by supplementation of the feed with additional vitamins or growth-promoting factors. A level of 0.04 per cent thyroprotein (18 gm. per 100

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pounds) in the diet of day-old chicks did not have a consistent effect on body weight. In some experiments this level of thyroprotein showed a depressing effect while in other experiments it caused a slight increase in body weight. It has been discovered that the differences in thyroid hormone secretion rate and consequently in the response to thyroprotein feeding, could be attributed to differences in breed, species, age and environmental conditions. Two other important factors in that respect are the basal diet used and the amount of nutrients stored in the tissues of the animals at the beginning of the experimental period.

Lower levels of thyroprotein (0.01 and 0.02 per cent) gave almost significant stimulus to the growth rate over that of the controls when chicks were started on the experiment at the age of two weeks but not at the age of three weeks. Chicks at the younger age appeared to be more sensitive to thyroprotein feeding than three weeks-old chicks. The weights of the thyroids were smaller for both levels of thyroprotein (0.01 and 0.02 per cent) when the starting age was two weeks.

APF at a level of 0.5 per cent in the diet caused a growth response greater than the maximum response obtained with the control feed. The same level of APF was effective in promoting a growth rate over that of the controls when thyroprotein constituted as much as 0.06 per cent of the feed. Increasing the level of APF to 1.0 per cent had no beneficial effect over that obtained with the 0.5 per cent level.

Vitamin B₁₂ (3 ug. per 100 gm. of feed) was equally as effective as 0.5 per cent APF in promoting growth in chicks receiving control feed. However, in the hyperthyroid chick, APF was more effective in growth stimulation.

DRAMA

THOMAS D'URFEY'S THE RICHMOND HEIRESS OR, A WOMAN ONCE IN THE RIGHT AN EDITION, WITH INTRODUCTION AND NOTES

(Publication No. 2699)*

Raymond Adam Biswanger, Jr., Ph.D.
University of Pennsylvania, 1951

This dissertation consists of a modern critical edition of Thomas D'Urfey's comedy The Richmond Heiress: Or, A Woman Once in the Right, 1693. The text has been collated with every known state or issue of the first edition, and with the second edition of 1718, and all variants have been recorded. The spelling, capitalization, and punctuation of the original text have been retained, except in readings which were obviously incorrect or ambiguous, in which cases corrected or improved readings from other textual variants of the first edition, or from the second edition have been inserted in the text, the original reading being relegated to the footnotes. Explanatory notes have been supplied to define or clarify words or phrases now obscure.

The introduction consists of the following seven sections:

A. Historical Approaches to Early Sentimental Comedy, a discussion of past scholarship in this field, particularly the work of A. W. Ward, O. Waterhouse, Ernest Bernbaum, D. C. Croissant, F. T. Wood, R. S. Forsythe, and K. M. Lynch.

B. Thomas D'Urfey: His Literary Career and Works, a brief discussion of episodes in D'Urfey's life, together with a list of his plays and important songs.

C. D'Urfey's Contributions to Sentimental Comedy, a review of sentimental elements in Madam Fickle (1676), The Virtuous Wife (1679), Love for Money (1691), and The Campaigners (1698).

D. An Analysis of The Richmond Heiress, including its strongly sentimental tone. This section is subdivided into the following parts:

1. Plot and Tone
2. Characters, Sources, and Analogues
3. Allusions to Actors
4. The Songs

E. Stage History, a listing of every known performance, with some observations on the play from a letter of John Dryden.

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F. Bibliography, a discussion of the various textual variants of the first edition of 1693, together with reasons for placing the issues in a given chronological order.

G. The Text, silent and recorded changes, and an explanation of each.

DECEPTION IN ELIZABETHAN COMEDY AN ANALYTICAL STUDY

(Publication No. 2804)*

Rev. John Vincent Curry, S. J., Ph. D.
Columbia University, 1951

In this dissertation the uses of deception as a functional element of dramatic technique in the comedies of Elizabethan England were the subject of an analytical survey conducted from a series of view-points. First of all, a classification of the agents of deception, according to the various objectives pursued by them, into such groups as mischief-makers, exhibitors of folly, lovers' helpers, intriguing lovers, intriguing rogues, and testers of other people's virtue, showed that the deceivers in Elizabethan comedy were not so stereotyped as were the agents of deception of other times and stages, such as the Latin tricky slave and the medieval Vice. Despite this diversification, it was by means of deception that members of all these types contributed materially to the dramatic movement of the plot. In so doing they all manifested certain resemblances in character trait, in behavior, and in structural function. The lineaments of these common features were accordingly synthesized in a composite portrait of the archetypal deceiver of Elizabethan comedy.

The contribution to dramatic movement made by the victims of deception, it was next found, was made principally by the various ways in which dupes assisted in their own duping. Examples of the several kinds of cooperation were analyzed. An arrangement of a number of dupes along their diverse levels of intelligence gave rise to an interesting problem, namely, whether there were any correspondence between the degree of intelligence manifested by a victim of deception and the degree of difficulty experienced, and the amount of ingenuity displayed, by a deceiver in gulling him. Evidence from the plays warranted a negative answer to this question and the significance of the answer seemed to be that what determined the amount of trickery exhibited by a deceiver was the

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Elizabethan author's desire to satisfy both the exigencies of his plot and the interest of contemporary audiences in trickery for its own sake. Hence, in this aspect, at least, of such situations, the Elizabethan comic dramatist did not attempt a realistic approach to the conditions of a corresponding situation in real life.

How frustrated deception could be functionally useful in comic plot structure was next illustrated by examples. In another chapter a sorting out of the varieties of artifices revealed the degrees of fullness with which a deceiver could identify himself with the means of deception he was employing.

Finally, the sources of audience appeal in the use of deception were shown to lie in certain functional values and comic effects either inherent in this element or achieved by its means. An increasingly sophisticated interest on the part of the audience in seeing dramatic conflict work itself out in deception was catered to by dramatists, as the Elizabethan Age progressed, by an intensifying complexity of comic intrigue. Deception also appealed to the audience as an exhibition of virtuosity in trickery interesting for its own sake. This interest was brought to focus on the chief deceivers, who were sometimes highlighted beyond the requirements of their original function of manipulating the intrigue. Further sources of audience appeal lay in the effectiveness of trickery in heightening the spirit of mirth and laughter in a play and in stimulating an ironic and satiric temper in the spectators.

Each of the avenues from which this subject was approached led to the clarification and strengthening of the over-all thesis of this study, namely, that deception was both pervasive and effective as a functional element in the dramatic structure of Elizabethan comedies.

THE DECLINE AND FALL OF IRISH DRAMA

(Publication No. 2864)*

Irving David Suss, Ph.D.
Columbia University, 1951

During the last fifty years Ireland has trembled under the impact of revolution and civil war, and for the first time in centuries of effort to eject a foreign invader, it has emerged successful. This same half-century saw the development of a truly indigenous drama — a movement that represented the chief contribution of the so-called Irish Renaissance. There has always been in Ireland a

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close bond between art and revolution, and this fact argues not only a deep connection between political events and literature but, more important, a fundamental and intimate tie between a culture and the literary mind. For the literary event did not follow the political, nor did it come before; rather both sprang together out of the deep-seated imperative of an age.

From the literature which Ireland has produced it is possible to determine an important, if not the chief, psychological and philosophical pattern in the culture of the country. In the literary product of Ireland, from the legends to the works of the 20th century, is found a consistency of outlook that argues a necessity from the point of view of psychology and art. This pattern involves the need to fail, or pessimism on the philosophical level and masochism on the psychological.

The best plays of the Abbey Theatre, during the years when W. B. Yeats and Lady Gregory protected the integrity of the artist by judging the works to be produced only from the point of view of literary quality, followed the pattern of the legends and the major works of the later periods of Irish letters.

On the other hand, there has existed in Ireland, since the mid-19th century, at least, a point of view which is diametrically opposed to the persistent pattern which has appeared in Ireland's great literature. This second outlook is intimately associated with the optimistic outlook of Roman Catholicism, Ireland's state religion, and nationalism. The success pattern is substituted for heroic frustration; the Irishman is deemed too worthy to fail. In the past, professional nationalism, insisting on a point of view at odds with the sentiment produced by the culture and a part of it, has produced only sub-literary works.

Starting in 1924, when the first government subsidy was granted to the Abbey, representatives of the professional nationalists began infiltrating the Abbey's Board of Directors. After the death of Yeats control of the theatre was firmly in the hands of a chauvinist group.

Then began in earnest the process of producing only those plays which reflected the ideals of professional nationalism — censorship by selection. A fundamental aspect of the ethos is denied expression on the Abbey stage, and Ireland's best writers have turned to other modes — poetry, the novel, the short story — leaving to others a theatre that selects plays on the basis of artistically irrelevant criteria. The plays which the Abbey now produces, cut off as they are from the deeply-felt cultural heritage, are contrived surface exercises without quality.

ECONOMICS

LOCATIONAL CHANGES IN THE FOOD PROCESSING INDUSTRIES BETWEEN 1939 AND 1947

(Publication No. 2725)*

Gerald Robert Abbenhaus, Ph.D.
University of Illinois, 1951

The purpose of this investigation was to determine whether external or internal events occurring between 1939 and 1947 caused changes in the locational pattern of the 43 food processing industries. The changes are presented on an interregional basis for the entire United States and on an intraregional basis for the North Central Region.

This study is a comparative static analysis. It compares the locational structure of the food processing industries in 1947 with that for 1939. The reports of the Census of Manufactures for 1939 and 1947 are the primary sources of data used. They provide the best raw material available on the food processing industries. Two measures of output, value added by manufacture and number of production workers, are used to show locational changes.

In 1947, the regional distribution of value added, production workers, and plants for each food processing industry, had altered considerably from the 1939 distribution pattern. Food manufacturing probably is more important in the economy of most of the nine geographic regions than any other single type of manufacturing. Nevertheless it varies greatly in relative importance among the regions.

Factors responsible for regional locational changes in output can be classified into eight categories. These are: 1) technology, 2) population, 3) changes in raw materials, 4) governmental influence, 5) pricing systems, 6) changes in tastes, 7) economic fluctuations, 8) special, indirect, or miscellaneous factors. Actual locational changes in output can take place by two principal methods, 1) movement of physical productive facilities, and 2) different growth rates among regions. A multi-plant firm can make use of depreciation reserves to aid in plant relocation. Differential growth rates of an industry among regions is the most important method by which regional output changes occur. The magnitude of interregional changes in location tends to vary inversely with the size of the industry. Most of the large industries had smaller regional shifts than did some of the relatively small industries.

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Most food processing industries are located where the advantages of the location outweigh the disadvantages. For this reason some industries, chiefly market-oriented, find it to their advantage to locate in metropolitan areas. Other industries, chiefly material-oriented, find it advantageous to locate in non-metropolitan areas.

The ten largest food processing centers in the North Central Region are leaders for different reasons. They fall into at least three general categories. The Chicago, St. Louis, Milwaukee, Minneapolis-St. Paul, Cincinnati, and Indianapolis metropolitan areas have a relatively large population and also have other locational advantages for certain food manufacturing industries. They attract not only market-oriented industries but also industries with locational flexibility. The Detroit and Cleveland areas are industrial centers with large populations but do not tend to attract major food industries other than those necessarily market-oriented. The Peoria and Kansas City areas have certain locational advantages for food processing other than in the market-oriented industries. These two areas have a lower relative rank in population than in food processing.

The three largest food manufacturing industries in the United States — bread and other bakery products, meat packing and malt liquors — tend to locate in metropolitan areas in the North Central Region. Although primarily material-oriented, meat packing was among the three leading food processing industries in all of the ten metropolitan areas in 1947. Bread and other bakery products — a closely market-oriented industry — was second or third in eight of the ten areas. Malt liquor was the largest in five and second largest in one of the ten North Central Metropolitan areas.

CONSUMER FINANCED TESTING AND RATING AGENCIES IN THE UNITED STATES

(Publication No. 2789)*

Eugene Robert Beem, Ph. D.
University of Pennsylvania, 1951

Despite the rapid growth of consumer financed testing and rating agencies and the important role they have played in the consumer movement, there has been no complete and objective study of these consumer counseling organizations. The purpose of this dissertation is to fill the void of reliable information about these agencies

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with a description, analysis, and evaluation of their development and relation to the consumer movement, their operation, and their role in the economy of the United States.

In its broad sense, the Consumer Movement refers to the efforts of individuals and groups, acting more or less in concert, to solve consumer problems. Consumer financed testing and rating agencies are a part of, and a logical outgrowth of this general movement which began a century ago. These agencies in turn were one of the most important causal factors in the great burst of activities in behalf of consumers that began in the 1930's and has continued at an accelerated pace.

Consumer financed testing and rating agencies are non-profit organizations dedicated to the alleviation of the consumers' plight. They work toward their goal in a variety of ways, the most important of which is the testing and comparative rating of consumer goods. Services are offered primarily through publication. The first of these agencies, Consumer Research, was started in 1929 and had about 100,000 subscribers early in 1950. The second consumer rating agency, in point of time, was Intermountain Consumers' Service, established in 1932. Because the circulation of this agency has been very small, and because its publications have been irregular and infrequent in recent years, this agency is excluded from primary consideration in the study. Consumers Union, the third of the consumer rating agencies, was established in 1936 as the result of a strike at Consumers' Research. Consumers Union is the largest of the rating agencies with a circulation of 400,000 as of April, 1950.

An evaluation of Consumers Union and Consumers' Research from the standpoint of whether the agencies are doing the maximum possible, within their unavoidable limitations, to alleviate the plight of consumers, leads to the following conclusions: 1) From all indications both agencies are thoroughly independent. There is no evidence of domination by certain business or subversive influences. 2) In the unanimous opinion of six technical experts consulted by the present writer, both agencies are doing competent testing work. 3) While Consumers Union is less at fault than Consumers' Research, neither agency shows a consistent appreciation of the limitations of consumer goods testing. 4) Both agencies appear to be objective in their technical work, but this is not always the case in their non-technical activities. Both agencies display a tendency toward sensationalism, but this is perhaps the only way to arouse action on consumer problems which need attention, even though many are not so serious as reported. Consumers Union's efforts on behalf of consumers have been impeded by its pro-labor bias. 5) Both Consumers Union and Consumers' Research have overlooked ways in which they might contribute more fully to a solution of consumers problems.

Consumer financed testing and rating agencies are not a panacea for the predicament of the consumer. Nevertheless, despite their shortcomings, they have been a useful guide for some consumers, and the warfare which these agencies have waged against consumer exploitation has constituted a step toward alleviating the plight of consumers in general.

AN ECONOMIC ANALYSIS OF SELF SERVICE
MEAT MARKETING
A STUDY OF THE APPLICATION OF THE THEORY OF
INNOVATION TO A DEVELOPMENT IN MARKETING

(Publication No. 2711)*

William Ralbert Bennett, Ph.D.
University of Illinois, 1951

The purpose of this study is to analyze a recent development in food retailing, the self service marketing of fresh meats. Self service meat marketing is the practice of cutting, weighing, wrapping, heat sealing, and displaying the meat in open display cases from which the customers serve themselves. The development requires a change in the combination of the factors of production used in marketing meat. This study is of the change and of its impact on producers, middlemen, and consumers.

Schumpeter's theory of innovation is used as the theoretical framework of the analysis. The first chapter contains a statement of this theory and a discussion of its application to marketing. The theory is a prediction of the results of changes in production functions (innovations) and serves as the basis for observations made in later chapters.

The second chapter is concerned with the economic and institutional background of the industry into which the innovation was introduced. The effect of an improvement in the retail marketing of meat is to a large extent conditioned by supply and demand peculiarities of the meat industry.

The third chapter is an analysis of the impact of self service meat marketing on price, output, costs, and the employment of resources. Data were obtained from trade paper articles, studies published by packers, retailers, and trade associations, United States government bulletins, university studies, letters from executives in the meat industry, and personal interviews. Points

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covered are comparative costs of conventional and self service marketing, retailer and labor reaction to the innovation, and the effect of the innovation on the structure of retail trade.

The fourth chapter is an analysis of consumer reaction to the innovation. Surveys made by representatives of business, education, and government indicate that consumers have accepted the innovation. The purpose of the author's survey, made in Champaign-Urbana, Illinois, was to determine consumer attributes associated with acceptance of the innovation. A sample of 447 households was drawn from a revised address list of the 1949 Champaign-Urbana city directory by use of Kendall and Smith's tables of random numbers, and 432 schedules were completed. The overall sampling error was 2.4 percent. An attempt was made to reduce non sampling errors by careful briefing of interviewers, pretesting the questionnaire, making call backs on those not at home on the first two visits, calling a second time on all who refused to answer questions, and careful editing and tabulation.

Hypotheses concerning relationships of consumer attributes to place of most of fresh meat purchases of Champaign-Urbana households were tested by use of the statistic, Chi square. Differences between the observed and expected (no relationship between the attribute and place of most of fresh meat purchases of households) could be explained by sampling variations for the following attributes: distance from a self service meat department, presence of someone at home on one of the first two visits, size of family, income, and residence in the campus area. Differences could not be explained by sampling variations for the following: number of self service meat departments in the area, opinions of self service meat marketing, method of shopping, and housekeeping experience.

It appears that self service meat marketing does not cause a radical change in consumer meat shopping habits, and that other store attributes such as location, management, and lines handled are more important in determining place of meat purchases. The consumer seems to accept the new method of selling meat readily if the store where he trades adopts the development.

THE MASTER WEAVERS INSTITUTE: A CASE STUDY
OF MULTI-EMPLOYER BARGAINING

(Publication No. 2796)*

Monroe Berkowitz, Ph.D.
Columbia University, 1951

The purpose of this study is to describe, analyze and evaluate the collective bargaining relationship between the Master Weavers Institute, an organization of employers in the jacquard and novelty weaving industry in Paterson, New Jersey, and Local 87 of the Textile Workers Union of America, CIO.

Labor unions in the area antedate even the establishment of the first silk mill in Paterson in 1838, but prior to 1933 they were unable to establish formal bargaining relations with the silk manufacturers. Their activity resulted in frequent strikes in an industry which has been declining in importance in Paterson since the first World War.

In 1933 the industry was involved in a strike which was settled when a group of jacquard employers formed the Master Weavers Institute and offered a combination of AFL unions, predecessors of Local 87, a slight wage increase and a signed two-year contract.

Examination of the 1933 pact reveals it to be a hesitant attempt at formal collective bargaining by two parties who were still a bit wary of one another. After a two year lapse in formal relations (1935-1937) the parties negotiated a different sort of an agreement, the conscious goals of which were identical with those they had been groping toward in 1933 — peace and stability. In 1937 the Institute, under the guidance of its counsel, David L. Cole, was persuaded by Sidney Hillman, chairman of the Textile Workers Organizing Committee, to accept the Union as a full partner in the stabilization process. Changes designed to strengthen the Union as an institution are apparent in the 1937 contract.

Operating in what was for most years a favorable economic environment successive contracts were peacefully negotiated up to 1948 when the last two year contract under consideration was signed. As the relationship developed the parties were able to resolve non-wage issues in a mutually satisfactory manner, although the economic issues proved more difficult.

The Union pressed for uniform minimum wage rates which satisfied the manufacturers desire for stability in the local area.

* Microfilm copy of complete manuscript of 357 pages, \$4.46. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-533.

However, the employers complained that non-union mills in Pennsylvania were underselling them because of their lower wage rates and freedom from loom-load restrictions. Worsened competitive conditions in 1938 together with unsuccessful organizational campaigns in Pennsylvania forced the Union to agree to wage reductions which were not fully recouped until 1941.

The Institute continually pressed for extension of the loom-load restrictions to Pennsylvania but when this was not accomplished, it attempted to have them lifted in Paterson. Union leaders were aware of the necessity for their relaxation but were unable to persuade the rank and file until unsettled conditions during World War II unhinged customary attitudes. Regardless of immediate causes, the fundamental reasons for the abandonment of the loom-load limits was the existence of a competitive area free from these restrictions.

The collective bargaining relationship has not arrested the industry's decline in Paterson; neither has it brought undue prosperity to the remaining plants. However, collective bargaining cannot be condemned for not doing what it was not intended to do. Once the defects of the relationship are noted, one can conclude that collective bargaining has served the parties well. The evidence is that by combining forces and bargaining with the Union the employers reaped many advantages. Above all, in spite of Paterson's traditions, the parties were able to keep strife and turmoil from the industry.

SOME ECONOMIC IMPLICATIONS OF MULTIPLE EMPLOYER COLLECTIVE BARGAINING

(Publication No. 2714)*

Thomas Clinton Cobb, Ph.D.
University of Illinois, 1951

This thesis is a study of what is probably a transitional stage in the development of the institution of collective bargaining. As union organization of American labor has been extended throughout most sectors of the economy, employers have come to realize the values which may stem from joint association for purposes of bargaining with organized labor. It has been estimated that approximately 27% of the organized workers in this country are covered by agreements negotiated between a union and associations of

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employers. Such bargaining presently occurs on industry wide, regional, and city-wide or local-area bases.

Great diversity has characterized the economic problems, effects, and implications of this metamorphoses in the traditional form of collective bargaining. The objective of this study has been to provide a better understanding of multiple employer bargaining upon which to formulate intelligent and effective public policy. The literature dealing with the subject is as yet rather limited in extent and sporadic in nature, although an increasing amount of attention is being devoted to this very significant development in industrial relations. This study, based upon the literature at present available, has been oriented around five important and closely inter-related aspects of the bargaining relationship: 1) The scope and content of collective bargaining; 2) The factor of "bargaining power" in industrial relations; 3) The problem of wage uniformity; 4) The problem of union challenge to managerial control; and 5) The problem of union-management responsibility.

Within the outer confines of legislative limitations, economic factors establish the actual scope and content of multiple employer negotiations and final agreements. Public policy directed toward the control of union "monopoly power" through limiting the scope of bargaining units would be ineffectual unless at the same time it limited the industry or area-wide organizations of the union. In fact, outlawing of this type of bargaining system would materially weaken the bargaining position of the employer. Legislative limitations upon the subject matter of multiple employer bargaining would tend to force the union to other techniques than bargaining in order to effectuate its interests in those areas.

In considering the relation of multiple employer bargaining to the factor of bargaining power in industrial relations, it was evident that public policy directed toward "equalization of bargaining power" would be impossible to formulate in generalized terms. The great variety of effects of multiple employer bargaining upon the many determinants of the power over price which is exercised by each market adversary, mitigates against the possibility of simple legislative efforts to equalize the power of both.

Our examination of the problem of wage uniformity in industry indicated that, although it's a fundamental problem with diverse characteristics, it did not arise as a direct result of multiple employer bargaining. Furthermore, it was evident that this problem would continue to exist were public policy to outlaw this bargaining technique. The drive toward uniformity is a basic drive of unionism, and outlawing of multiple employer bargaining would not destroy unionism although it would seriously weaken the employer.

Accepting function integration of union and management as the most feasible solution to the problem of union challenge to

managerial control, the study indicated that multiple employer bargaining may contribute substantially to the resolution of this fundamental struggle. Significant for public policy is the conclusion that these have been developments which could not effectively have been forced upon the parties by legislative action.

Finally, it was evident that multiple employer bargaining has made important contributions to greater union and management responsibility. These also appeared to be outside the realm of effectuation through public policy.

STUDIES IN INNOVATION THEORY*

(Publication No. 2807)**

Harold Simeon Diamond, Ph. D.
Columbia University, 1951

Innovation theory is the subject of these Studies. They are investigations not of terminology as such, but as analysis of the economic and social behavior to which these terms may refer in their many aspects.

The chief result of this research is our view of the process of innovistic competition — the rivalry or conflict which accompanies innovation. It is perhaps the most important and striking part of the entire innovational process — a process which we have examined in some detail.

A major characteristic of innovistic competition is inter-industrial rivalry. New industries and products based on technological invention arise, fight their way into the economy and threaten already established industries and products with extinction. Innovistic competition seems to be shifting the scene of the fiercest struggle from the intra-industrial level — where it nevertheless has increased the pace of such competition — to the inter-industrial level where industry attacks industry with increasing rather than diminishing intensity, where entire industries rather than individual firms may lose the basis of their existence.

Innovistic competition also provides the setting for our new viewpoints in demand and production theory. In the former the "producer" is stressed as a leading factor in creating, maintaining,

* The reader's attention is called to pages 180 through 191 which represent a guide-summary of the main content and conclusions reached in these Studies.

** Microfilm copy of complete manuscript of 231 pages, \$2.89. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-544.

and changing consumer demand. In the latter, we stress the "progressive firm" as the focal point of much of economic change, and this change often is very significant in the short run.

Turning to business cycles and to macro-change, we have emphasized the importance of technological innovation and industrial research in connection with these subjects. It is our conclusion that the less the element of technical invention in innovation, the closer will be the approximation of the system to a condition of "cyclical circular flow." On the other hand we feel that great changes in the technology of a society are likely to change its other aspects, especially the structure and institutions of its economy.

The connection of technology and macro-change with the process of innovistic competition leads us to conclude that in dynamic, progressive economies innovistic competition is one of the leading factors which reshapes society. But through the growing possibility of more accurate forecasting of technological and related developments it appears that economic progress may be directed so that its path will be greatly smoothed and more intelligent and less costly adjustments to such changes may be made by society.

THE ILLINOIS COAL MINING INDUSTRY

(Publication No. 2728)*

Harry Mitchell Dixon, Ph.D.
University of Illinois, 1951

This is an economic study of particular portions of the Illinois coal mining history. It has been made for a twofold purpose: 1) to determine what are the important economic characteristics of the Illinois coal industry, and 2) to examine the following hypothesis: "If the Illinois coal industry remains free from arbitrary control by labor leaders and government, a concentration of coal production in the hands of a few operators will take place."

Following the introductory chapter, there are six chapters devoted to the study. The first three serve as background for the last three. For those who know very little about the general nature of coal and the bituminous coal industry, chapter II will provide a general discussion as to the nature of coal, the importance of the industry, and where and how coal is mined. A somewhat detailed survey of the physical characteristics of the Illinois field is given because of the great importance of the "land" factor in understanding the general development of the industry.

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Chapters III and IV provide historical perspective which is helpful in understanding the subsequent analysis. Since the beginning of coal production in Illinois in the early nineteenth century, many changes have occurred in the relative importance of coal-producing counties. Chapter III outlines these shifts and provides some of the reasons for them. Chapter IV continues the historical survey of the industry. The economic case history of each of four large coal companies in Illinois is considered. These case histories shed light on the type of entrepreneur managing our large Illinois companies. The past and present thinking of these leaders provides some understanding of past developments and a key to future trends.

The heart of the study is found in chapters V, VI, and VII. Chapter V follows the introductory chapters with a detailed sketch of changes in the competitive position of Illinois coal and changes in the supply of Illinois coal in the past few decades. The purpose of the chapter is to present a profile view of the important economic characteristics of the industry. This summary sketch serves as an economic setting for the analysis that follows in chapter VI.

Chapter VI presents an analysis of the Illinois coal industry in the past two decades. The trends evident from chapter V are discussed in various phases of economic activity. Technological changes are traced in reviewing the past two decades.

Projection of discernible trends set forth in chapters V and VI is made into the future in chapter VII. The purpose of the chapter is not to prophesy but merely to summarize what has gone before as an aid to understanding the implications for the future.

Chapter VII concludes with a discussion of the validity of the stated hypothesis. A decided trend toward fewer operators is revealed in chapters V and VI. The discussion of present conditions in the industry shows that these trends should continue. This study concludes that such reduction in the number of operators will proceed slowly, thus creating a more stable competitive product market. There is no reason for thinking at present that the reduction in numbers will lead to undesirable forms of imperfect competition. With many inventions awaiting exploitation and with a few aggressive entrepreneurs of the type discussed in chapter IV, sufficient uncertainty will be generated to keep the more lethargic entrepreneurs active in matching the innovators. Keeping up with the innovators will continue to provide the healthy competition that is so desirable.

AMERICAN SEAMEN: A STUDY IN
TWENTIETH CENTURY COLLECTIVE ACTION

(Publication No. 2815)*

Joseph Philip Goldberg, Ph.D.
Columbia University, 1950

This study analyzes the efforts of unlicensed seamen on the Atlantic and Pacific to overcome the obstacles to lasting organization which were inherent in their legal, economic, and social status. Basically, the history of their organization may be summed up as an attempt, first, to achieve control over the sale of their own labor; second, to extend the benefits obtained by shoreside workers to the sea; and, third, to protect these benefits through alliances with related workers.

Casual employment, competition from foreign ship operators with lower operating costs, and direct governmental concern with merchant shipping in periods of national crises have been the leading determinants of the unique character of industrial relations in the maritime industry. The growth of the labor movement, government encouragement of collective bargaining, and the consequent spread of collective bargaining have been important recent factors shaping the trend of industrial relations in the industry.

The issue of job control, result of the casual character of employment in the industry, underlies the history of the vast changes in the seamen's status during the past half century. The virtual monopoly by "crimps" over assignments to job openings at the turn of the century prevented the seamen from obtaining decent wages and working conditions. To meet this parasitic control, west coast seamen had organized their own unions in the eighties and sought to obtain recognition from ship operators. These efforts met with failure at first, but subsequently, from 1902 to 1921, collective bargaining appeared to be established on the west coast. On the east coast, crimps exercised control until the first World War. Only during the War did the east coast unions obtain some job control following partial recognition by the ship operators.

This unbalanced condition in the state of seamen's organization was reflected in the weakness of the International Seamen's Union, A. F. L. The union, led by Andrew Furuseth, drew virtually all of its strength from the west coast unions, led by the Sailors Union of the Pacific. The outstanding achievement of the I. S. U., or more

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appropriately, of Furuseth, was the enactment of the Seamen's Act of 1915. The Act, by setting up statutory qualifications for the seamen's calling, was intended to support the job control which had been obtained through collective bargaining.

Both the early establishment of collective bargaining and the effects of the Seamen's Act proved transitory, however. An unsuccessful strike during the recession of 1921 resulted in the decisive crushing of the seamen's organizations for more than a decade. The U. S. Shipping Board played an important part in the rout of the unions, for changes in its administration had been accompanied by changes in its former policy of encouraging collective bargaining. For the next 13 years, the employer agencies exercised almost complete job control on the west coast. On the east coast, crimps and employers shared control.

It was inevitable that, with the stimulus given collective bargaining by the National Industrial Recovery Act and the National Labor Relations Act, an immediate and intense reaction would be felt in maritime industrial relations. The west coast strike in 1934, and the 100-day strike in 1936-7, were primarily struggles over job control. The unions won complete job control through union hiring halls.

The last decade has seen maritime collective bargaining mature despite fluctuating economic conditions. Wartime acceptance of the union hiring halls by the War Shipping Administration was partly responsible. The ability of the parties to reach agreement on continuance of hiring hall arrangements, despite uncertainty over the closed shop ban of the Taft-Hartley Act, is most significant. The latter development occurred when maritime operations were declining and unemployment in the industry growing.

This study of the changes in the seamen's status deals also with the ideologies and tactics influencing these changes. Particular treatment is given to the conflicting ambitions and ideologies of the various unions and their leaders. Attention is also given to the tactics and ideologies of important industry and government officials and agencies.

SWEDISH ECONOMIC POLICY AND ECONOMIC STABILITY
(1920-1938)

(Publication No. 2820)*

Ralph Erdman Holben, Ph.D.
Columbia University, 1951

The purpose of this dissertation is to explain the role of government economic policy in influencing the rapidity and stability of economic development in Sweden. The approach is broad in scope. Although attention centers primarily on the period 1931-1938, when government policies were most highly integrated and most clearly directed to influencing general economic development, considerable attention is also devoted to an analysis of economic policy and the cyclical and structural components of economic change throughout the interwar period. This is done in order more clearly to reveal both how the formation of policy may have been influenced by prior experience and how the results of economic policies must be measured in terms of their effect on such component parts of economic development. Attention is also given to the intellectual climate of the period and to important institutional considerations with a view to revealing their relevance to the formation and successful execution of economic policy. In connection with the treatment of the institutional framework, some consideration is given to the economic characteristics of the country, social goals, political organization and the significance to the success of economic policy of the growing power and influence of private organizations.

International comparisons have been made in order better to appreciate the rapidity and stability of economic growth in Sweden during this period in a broader contexture. Such comparisons also serve occasionally to throw further light on the significance of key developments and the value of certain policies by indicating the results of alternative developments and policies in other countries. The dependence of Sweden on international trade and the importance of this dependence to Swedish analysis of the problem of economic stability, the reasons for the existence of domestic instability, and the actual formation of policies to counteract such foreign-induced instability form a sort of leitmotif to the entire analysis.

The treatment of the subject matter is essentially inductive. Although the approach is weighted heavily on the side of historical and statistical description of the course of economic development and of the nature and results of economic policies put into effect

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during this period, the effort is constantly made to appraise specific developments and policies in terms of their possible importance to our understanding of the stability of economic growth in Sweden. The concluding chapter appraises the effects of economic policies instituted during the early 1930's and raises certain theoretical issues suggested by Swedish experience during this period. An attempt is also made to give an explanation of the more rapid rate of recovery from the depression of the early 1930's than from the depression of the early 1920's, and to the absence of secular stagnation during the 1930's.

Some of the more important conclusions of the dissertation are: are: a) although international price movements and the volume and value of export trade were of primary importance in determining domestic stability and the rate of economic growth prior to 1932, expansion within the home market, especially the production of consumption goods and residential construction activity subsequently superseded the role of exports and international prices in this respect; b) this structural change, as well as others of importance, were in large measure the consequence of government economic policies instituted during the early 1930's; c) in addition to the influence of government economic policies and a revival of export trade on the rapid rate of recovery after 1933, importance must also be attached to certain other conditions conclusive to a rapid and stable recovery of private investment: the stability of consumption prices and the relationship of raw material import costs and wage costs to domestic wholesale prices; d) Swedish experience suggests that there may be an important relationship between consumption price stability and the rate of growth of the volume of consumption; rising consumption prices during the first years of recovery may affect income distribution in a manner that will reduce the marginal propensity to consume and, consequently, the extent and stability of recovery.

**THE MARGARINE INDUSTRY IN THE UNITED STATES
ITS DEVELOPMENT UNDER LEGISLATIVE CONTROL**

(Publication No. 2821)*

Martha Crampton Howard, Ph.D.
Columbia University, 1951

The margarine industry, beginning in the United States in 1873, typified American business ingenuity by employing the byproducts of existing industries and by creating a substitute for a more expensive product. It has differed from other American industries in the unique extent to which it has been restricted by special legislation.

Margarine, as a product of industrial research, was felt by agriculturists to represent a threat to the products of the farm. Because of their fears of competition from a substitute product and of its fraudulent retail sale as butter, the dairy organizations cultivated strong opposition to margarine, culminating in the Federal Oleomargarine Law of 1886 and anti-color laws in many states in the 1890's.

Since taxes and other controls imposed by these laws failed to eliminate fraud or to quiet the dairy interests' fears of margarine as a competitor, the Federal Law was amended in 1902 so as to impose a much higher tax rate on artificially colored margarine (10¢) than on the uncolored (1/4¢) and to place margarine in interstate commerce under authority of state laws. By encouraging experimentation with various vegetable oils that would impart a "natural" yellow color which up to that time had been largely an animal fat product, this legislation probably contributed to the evolution at a later date of an all-vegetable oil margarine.

The difficulty of enforcing the law and the prevailing uncertainty concerning the legal definition of oleomargarine led to further amendments of the Federal Law in 1930 and 1931. The new law imposed the 10¢ tax on all yellow margarine, regardless of whether the color was artificial or natural. All of these successive Federal laws resulted only temporarily in actual decreases in total output of margarine, but production of colored margarine was almost entirely eliminated by the Law of 1931.

During the 1920's several states imposed license fees on manufacturers and dealers in margarine, and from 1929 to 1931 a number of states imposed per-pound taxes on the product. These license

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fees and taxes severely curtailed the sale of margarine in several states. From 1933-35 a series of so-called "domestic fats" laws were adopted, principally in southern states, taxing margarine only when made of foreign oils. This type of law occurred because of the increasing use of coconut oil in margarine, beginning with the perfection of the coconut product in 1915.

The industry has always gained its most effective support in its legislative battles from the producers of the ingredients used in the product. The development of cottonseed oil margarine in 1933 had great political significance in enlisting more active and concerted aid than ever before from the cotton oil interests. Later the increasing use of soybean oil as an ingredient brought another agricultural group to the aid of the product.

Such increasing support from the ingredients groups, as well as the growing prestige of the margarine industry which resulted from complete eradication of fraudulent selling and wider acceptance of the product by consumers, culminated in repeal during the decade 1940-50 of a number of the state laws and of the Federal Law.

The survival of the margarine industry, and its tremendous expansion during the past decade, in spite of its legislative binders, have been due to the enterprise and foresight and the sense of responsibility of its present members, as well as to the shortage of fat products occasioned by World War II.

This account of the growth of the industry from its early days focuses on the pressures compelling and resisting the legislation and on the impact of the laws themselves.

INTERNATIONAL BALANCE OF PAYMENTS ADJUSTMENT UNDER THE GOLD STANDARD

(Publication No. 2719)*

James Robert Maddox, Ph.D.
University of Illinois, 1951

The purpose of this study was to investigate the mechanism by which the various national economies adjust to a disequilibrium in the balance of payments under stable exchange rates. The recent manifestations of disequilibrium have been the chronic foreign exchange shortages, which have led to all manner of trade and monetary policies designed to escape or soften the effects of imbalance.

* Microfilm copy of complete manuscript of 208 pages, \$2.60.
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The theorists have worked with two approaches, the price approach, and the income approach. While these two methods were examined in the paper, the principal objective was an integration of the two, with additions of further pertinent factors in the process. The "long run" was viewed as a series of short runs, and the really significant problem was the establishment of "acceptable equilibrium." Acceptable equilibrium involves both an equilibrium exchange rate and levels of living equal to those which are potentially possible through full utilization of resources and technology.

The re-examination of the theories of adjustment involved research among the available works, for general agreement, disagreement, and even dissatisfaction with the conventional explanations. Disagreement and dissatisfaction was evidenced particularly in price studies where empirical evidence failed to sustain the theoretical formulations. While the price theorists assumed stable income, the income theorists generally worked with the assumption of stable prices. Neither of these methods prevented the assemblage of a rather comprehensive body of understanding of prices and income. The task of this paper was to attempt to fit the two together and weigh their relative importance. Moreover, if it were true that price-income adjustments yielded unsatisfactory results aside from exchange rate equilibrium, the problem was to determine if there were other adjustments which nations made or might make to disequilibrium in a somewhat longer period of time.

It was concluded that the short run effects of disequilibrium were both price and income adjustments and that the relative importance of the two was determined by the relative rates at which they changed. The rates of change of prices and real income, in turn, depended upon the internal economic structure of the various nations, as well as their relations with the outside world. The combined effects of real income and price changes could be shown as money income changes. International relationships were altered by the fact that changes in money income varied between nations. The concept of supply elasticity was used to relate price to real income. Supply elasticity as one determinant of price and income change was itself found to depend upon technological change which can also be treated as a variable. The relationship of price elasticity of demand for imports to the income elasticity of demand for imports was broadly conceived as a relation of the slope of the demand curve to shifts of the demand curve. Simply stated, a change in income shifts the demand curve whose slope denotes price elasticity. The price effects and real income effects of such shifts depends upon supply elasticity, the possibilities of changes in supply, as well as changes which may occur in the slope of the curve after it has shifted to the right or left.

The basic conditions, exerting a strong influence on the supply

and demand variables were concluded to be the level of employment and technologically determined productive potential. The former condition is more variable in the short run and would effect the ability to achieve exchange rate equilibrium, but full employment would not insure equilibrium. Acceptable equilibrium could be achieved under conditions of full employment and maximum world-wide utilization of technological knowhow. Under such conditions exchange rate equilibrium would not appear as a serious problem or a chronic problem. In essence the long run problem of disequilibrium could be solved only by a more equitable distribution of world income; the more equitable distribution itself to be achieved by dissemination and utilization of technological knowhow.

**A STUDY OF THE HYDRO-ELECTRIC POWER
COMMISSION OF ONTARIO**

(Publication No. 2841)*

Frederic Patric Morrissey, Ph.D.
Columbia University, 1951

This study examines the organization of the electric utility industry in the Province of Ontario, Canada, where a municipal co-operative program has been in operation for almost half a century. It is an investigation of the origin, development, and organization of the enterprise, the financing and pricing procedures, and the rural electrification program. Finally, it appraises the success or failure of the program in the light of its achievements and shortcomings.

Public ownership in Ontario was initiated by the action of certain municipalities to secure cheaper sources of electric power, an origin reflected even today in the dominance of the municipal interest in the electric supply and distribution. The organization is based on a separation of functions with a central Commission, the Hydro-Electric Power Commission of Ontario, acting as the supplier of electricity, and with local municipal commissions assuming the distributive function. In rural areas and in Northern Ontario, the Commission performs both duties. The central body also carries out executive and administrative responsibilities in rate regulation, electrical inspection, water power surveys, etc.

The financing and rate-making policies are examined in some detail. The large amounts of capital required by the electric utility

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industry have been afforded by pledging the joint credit of the participating municipalities and the Province, with the former bearing the ultimate financial responsibility.

To ensure a self-supporting enterprise, the central Commission is required to sell electricity to the municipalities "at cost." Included as a cost item is a unique provision for amortizing all the outstanding debt of the organization and thus building up the equity interest of the municipalities.

The dominating feature of the rate-making principles has been the utilization of a rate structure designed to promote widespread utilization of electricity in an area devoid of substitute fuels. Accordingly, a highly promotional rate structure has been in use from the inception of the program. The self-supporting principle was abandoned in rural electrification and reliance has been placed on substantial subsidies to reduce the costs of electricity to rural consumers.

In Northern Ontario, the Province has assumed full responsibility for the development of electric power largely to aid exploitation of the mineral resources of this frontier area, and the Commission operates the facilities here for the Province.

The experience of the Ontario program demonstrates the feasibility of public ownership in a crucial sector aimed at encouraging economic development. Its success is attested by the extremely low rates, high consumption and sound financial position. While this experiment does not prove government ownership is more efficient than private enterprise, it does indicate public ownership is not inevitably inefficient.

SOME ECONOMIC ASPECTS OF UNITED STATES INTERNATIONAL AIR TRANSPORTATION

(Publication No. 2721)*

James Preston Payne, Jr., Ph.D.
University of Illinois, 1951

International air transportation occupies an important place in the transportation system of the United States. It is instrumental in promoting commerce and trade among the various nations of the world. For the fiscal year ending June 30, 1949, U. S. international air carriers had a total operating revenue of \$ 255,084,092 and had

* Microfilm copy of complete manuscript of 653 pages, \$7.51. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-462.

flown 2,017,821,000 revenue-passenger miles.* Many difficult problems are encountered in conducting international air services. These problems are both political and economic problems.

The objective of the study is to examine and analyze some of the more important economic aspects and environmental factors of United States international air transport operations. The study is divided into two main divisions — regulation of the industry, and problems and policy issues in the industry. Regulation is evidenced by a national statute, an intergovernmental convention, an international association of air carriers, and numerous bilateral agreements between the United States and foreign countries. The major problem examined is international rate determination. Two policy issues are analyzed — the controversy of surface carrier participation in air transportation, and competing international air carriers versus a chosen instrument.

Several conclusions are derived from the study. Regulation on the national governmental level is not complete. The analysis of the Civil Aeronautics Act of 1938 revealed three important deficiencies. One, the Civil Aeronautics Board (CAB) lacks regulatory authority over the rates of international air carriers. Two, the Board does not have authority over security issues. Three, orders of the Board in respect to foreign air carriers which are subject to the approval of the President are exempt from judicial review. It is concluded that authority over rates of air carriers in foreign air transportation is desirable. Effective control by the Board over security issues of the air carriers is deemed advisable. Notwithstanding the necessity of Presidential approval of CAB orders in international air transportation, it appears that judicial review of that portion of the order clearly the work of the Board would be advantageous.

Attempts to draft an acceptable multilateral convention on commercial air rights have not succeeded. All nations adhere to the doctrine of national sovereignty over the airspace above their territories. These two facts have necessitated the use of bilateral air agreements among nations for international air services. The International Civil Aviation Organization has made definite progress in the technical and political fields, and it has achieved desirable results in its economic studies and safety projects.

Bilateral air agreements have designated the International Air Transport Association as the rate-making agency for international air services. The research failed to reveal an absolute conclusion as to the exact method of setting specific rates. Several possibilities are examined in the attempt to determine the relationship of

* CAB, Annual Report of the Civil Aeronautics Board, 1949, pp. 58-59.

rates to the cost of providing efficient service. Political considerations are often weighty in rate determination.

The issue of surface carrier participation in air transport is approached from two different angles — the legal and the economic. There is no legal prohibition against surface carrier participation in air transportation. It is felt that no change is necessary in the present statute to permit participation, where a showing can be made that the utilization of aircraft to supplement the major operation is in the public interest. National transportation coordination may be promoted by certain sea-air combined services. Economies thought possible through avoidance of duplication may be severely limited because of the passage of time. Sea-air combined services and their desirable benefits may be possible through working agreements between air carriers and surface carriers.

The final issue of competing international air carriers versus a chosen instrument is resolved in favor of competing carriers on those routes where traffic justifies competing services. This does not mean excessive competition, nor is it intended to support competition where none is necessary or desirable. The recent North Atlantic Route Transfer Case does not appear to alter this conclusion. Policy must be flexible enough to meet the demands of a dynamic society.

STATE-WIDE TELEPHONE RATES

(Publication No. 2869)*

Samuel Bernard Richmond, Ph.D.
Columbia University, 1951

Two steps are involved in the determination of public utility rates under regulation. First, the total return to the company in the appropriate jurisdiction is determined, and second, the rate schedule is constructed to yield this desired return. A great number of possible rate schedules may be constructed that would yield this total return. This paper deals with one aspect of the problem of the construction of the rate schedules; namely, the determination of the differentials that apply to comparable services in different exchanges. The specific problem treated here is the setting of the rate relationships for the local exchange service among the various exchanges served by a telephone company operating more than one exchange in a given state.

* Microfilm copy of complete manuscript of 283 pages, \$3.54. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-605.

The rates for the local exchange service may be uniform throughout the area under consideration, or there may be differentials among the exchanges, with these differentials based on the cost of the service or on the value of the service. Of course, some uniform rate area is inevitable since it is not feasible to treat subscribers individually. This uniform rate area may be the exchange, a group of exchanges, or the entire intrastate area served by the utility.

The method in common use today is the so-called "state-wide basis." Under this system, the exchanges are grouped according to size, and uniform rates and classes of service are applied within each group, and the rates increase with the size of the exchange. The reason given for this practice is that the rates should reflect the value of the service, which is dependent upon the number of stations that may be called toll-free.

This value of the service basis is used except where prohibited by the regulatory body. A survey of the practice in fifty United States jurisdictions (48 states plus Hawaii and Puerto Rico — this problem obviously does not exist in the District of Columbia) showed that Delaware, Iowa, and Texas have no history of telephone rate regulation; Connecticut and New Hampshire accept the state-wide basis only with reservations; California, Minnesota, and Wisconsin definitely reject it; and the other forty-two approve of it. The survey included a detailed study of the history and practice in the State of New York, which is a strong supporter of the state-wide basis.

The value of the service basis was deemed unsatisfactory because it is ambiguous, it cannot be measured, and it produces undesirable rate relationships, hidden subsidies, and unfair discrimination, especially against dwellers in large cities.

A cost basis should be used. Costs can be determined objectively and they can be applied to produce rate schedules that are more equitable than those yielded by the state-wide, or value of the service, basis. Two alternative cost bases might be used: incremental cost, which is the sounder theoretically; and "full," or average, cost, which is the more practical.

THE ST. LOUIS LABOR HEALTH INSTITUTE

(Publication No. 2898)*

William Eugene Rogers, Ph.D.
University of Missouri, 1951

This study describes and evaluates the effect of what is probably the first comprehensive group medical program controlled by a union but financed entirely by employers. The Warehouse and Distribution Workers' Union, Local 688, International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers, A. F. of L., is the Union which promoted and has controlled the Labor Health Institute since its inception in 1945.

The adequacy of the medical program, its weaknesses, and the basic issue between the Union and management concerning the LHI are problems which this investigation attempts to answer. Further, consideration is given to the broader implications of such a medical program and the possibilities of extending the principles of the LHI to other industrial and union areas.

Over 97 percent of the LHI members have acquired medical benefits through contract provisions negotiated by Local 688. A contract provision has been developed requiring employers to pay to LHI a percentage of the payroll of persons under contract. This payment entitles the employees and their dependents to complete medical, dental and hospital care.

Comparison of services with other group medical plans indicates that LHI is among the best of the country's medical programs. The cost of medical and hospital care through the LHI was compared to other group plans, private fee for service practice and reimbursement insurance plans. From this data LHI appears to have considerably lower costs per eligible person than do either reimbursement plans or private fee for service practice. However, the cost of medical service in the LHI is higher than most of the other group practice plans investigated. Despite this fact the LHI medical care is worth the expenditure made by employers in so far as medical service is concerned.

Although over 75 percent of the companies have accepted the LHI, the general attitude of employers has been in opposition to the medical program. Management feels that it receives no credit for the welfare program, with the result that loyalties of employees are shifted to the Union. The Union approves of this tendency to

* Microfilm copy of complete manuscript of 277 pages, \$3.46. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-634.

reinforce its position, but the employers fear a decline in the effectiveness of managerial leadership with a resulting decrease in productivity.

A survey of the employers revealed that they do not believe that the medical program has resulted in any benefit to management. Interviews with various employers indicated that the basic issue between the Union and management concerned the extent of responsibility which the employer should accept for medical care. Management acknowledged that the matter of the LHI was bargainable but they did not believe that it should be. The question of medical care was an individual problem which the employer should not finance for employees. The Union's position was diametrically opposed. One of the major responsibilities of management was for the well being of its employees. If management would not voluntarily institute welfare programs, the Union would do so, and the employer should finance them.

This problem of the social responsibility of management is the center of the controversy over the LHI. Management assumes a single line of responsibility to ownership with expenditures justified by a contribution to business returns. Management alone makes the decisions relative to the institution of welfare programs since only management knows problems involved.

The trend in our industrial society has been toward the acceptance of greater social responsibility by management. State safety codes, Workman's Compensation laws, regulations concerning women employees and finally, the National Labor Relations Act, have all placed greater responsibilities upon management. The single line of responsibility has been expanded through legal edict and changes in the attitudes of society. Management can no longer depend upon its traditional rights but must reorient its thinking to include responsibilities to employees.

A STUDY OF THE DEVELOPMENT OF MONETARY
THEORY OF ENGLISH ECONOMISTS IN THE
CLASSICAL TRADITION, 1776-1848

(Publication No. 2742)*

John Sagan, Jr., Ph.D.
University of Illinois, 1951

This study is an examination of the monetary theories of writers belonging to the classical tradition. It deals with Adam Smith, Henry Thornton, J.-B. Say, James Mill, David Ricardo and John Stuart Mill.

In order to analyze the monetary theory of any writer or group of writers, it is necessary to study the changing institutional setting within which their theories have been developed. This has been done and it was shown that the development of monetary theory, to a large extent, was a reflection of these institutional changes.

At the beginning of the classical period, the writers emphasized the theories of production and distribution. To do this, they abstracted from money and credit in the formulation of such theories. They believed that the basic laws controlling the operation of the economy were not affected by monetary factors. This attitude became the basis for their consideration of money as a veil. They felt that the principles governing the operation of the economy were determined by essentially barter-like relationships. They therefore adopted the concept that production formed the basis for demand and, within an adaptive productive process, was equal to it. It was a concept which had been used by Quesnay and Adam Smith but was formalized by Say and James Mill and is known as the law of markets or Say's law.

A charge has been leveled at the entire Classical School accusing its members of using the law of markets in lieu of a monetary theory. One purpose of this study has been to examine this charge and to see how this group of writers used the law of markets. A second aim has been to ascertain whether any unified body of monetary theory could be discovered in the works of these men and whether the use of the term "classical monetary theory" is valid.

On the basis of this study, we conclude that Say's law was accepted by the members of the Classical School but that, except for James Mill, it was not presented in lieu of a monetary theory. It was used as a basis for their conceptual model of the operation of

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the natural laws of production and distribution. This part of their writing has been labeled "model building" or what John Stuart Mill called the "abstract science." They maintained a strict assumptio-
tional framework which included competitive conditions, price flexibility, mobility of resources, perfect knowledge and an absence of all disturbing factors such as government regulations, taxation or wars.

The writers recognized that these assumptions were not always valid with the result that they also presented a monetary theory which was stressed in varying degrees. Thornton's work, for example, only emphasized the monetary aspects of the economy. Say and Ricardo, on the other hand, constructed a monetary theory, but to them it was one of deviations, exceptions, or qualifications from the "normal" situation, rather than a theory coordinate with their production and distribution theory. In John Stuart Mill is found the ultimate phase of the development of the thinking of this group with a clearly defined conceptual model very much in line with the other writers, but also with an explicit body of monetary theory.

We can find no theory which can be characterized as "classical monetary theory." Instead we find wide differences within this group, and any reference to the monetary theory of this period should be to the theory of the individual writers.

THE DEMAND FOR MEAT IN CANADA

(Publication No. 2745)*

Frederick Mallory Schrader, Ph.D.
University of Illinois, 1951

The objectives of this study are to consider the applicability of two methods of regression analysis to the study of the demand for meat, to determine the important forces influencing meat prices in Canada, and to construct statistical demand curves for meat consumed in Canada.

The two methods of regression analysis appraised are the single equation and the system of equations approaches. It was found that under certain conditions the first method becomes a particular although important case of the second. It is a particular case in that it is applicable to relatively perishable commodities, the production of which is time consuming. It is an important case because the agricultural commodities to which it is applicable are an

* Microfilm copy of complete manuscript of 163 pages, \$2.04. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-486.

important source of income for commercial farmers, and they comprise a large part of domestic and foreign trade and of consumer food and textile purchases. Meat is one of this group of commodities.

The demand curve sought is that representing the relationship between a schedule of quantities of meat purchased and a corresponding schedule of prices paid, prices and consumption of other goods and services varying as they normally do. Shifts of this demand curve are caused by such forces as changes in the value of money, changes in the level of consumers' income, and changes in the number of consumers. It is assumed that the influence on meat prices of consumer substitution of other goods and services is relatively small and cannot be measured with available data, that consumer substitution of one kind of meat for another is important and measurable, and that there have not been significant changes in tastes, habits, and customs during the period under study — 1926 to 1942. It was found that approximately 90 percent of the variation in the series of wholesale prices of all meat, adjusted for changes in the general price level, was associated with variations in the series of domestic consumption and consumers' real growth. It was also found that about 90 percent of the variation in deflated wholesale beef prices was associated with variations in the domestic consumption per capita of beef, consumers' real income per capita, and deflated wholesale prices of non-beef meats. In addition, approximately 90 percent of the variation in deflated wholesale pork prices was associated with variations in the domestic consumption per capita of pork, consumers' real income per capita, and deflated wholesale prices of non-pork meats. The influence of foreign demand is reflected in domestic consumption in this study.

Statistical demand curves were derived by the single equation method of analysis. Because these data include errors of observations, as do most data available for study, each variable in turn was used as dependent in a series of least squares solutions and the resulting regression coefficients, expressed in terms of the regression of price on each of the remaining variables, were averaged to provide the bases for computing elasticities of demand. The price elasticity of demand for all meat was found to be more inelastic at wholesale ($-.57$) than at retail ($-.83$). The price elasticity of demand for beef was found to be slightly higher than for all meat, and that for pork higher than for beef. The coefficients of cross elasticity of demand indicated that beef is substituted more readily for pork by consumers than pork is substituted for beef. It was also found that when consumers' incomes change there is a less than proportional change in the quantity of meat purchased.

CONCEPTS AND MEASUREMENT OF PRODUCTION AND PRODUCTIVITY

(Publication No. 2860)*

Irving Herbert Siegel, Ph.D.
Columbia University, 1951

The rationale and techniques of measurement of production and productivity changes through time have received insufficient attention. It is commonly not appreciated that such general terms imply a host of plausible measures; that a particular measure ought ideally to be selected with reference to a purpose or context; and that, in the absence of choice, some understanding is desirable of the algebraic conditions for one measure to exceed or fall below another. The importance of such ideas becomes evident in periods of national emergency or strained labor-management relations.

Production measurement may be approached from either of two viewpoints. The object may be to reflect the structure of activity; or attention may be focused on end products of activity complexes (e.g., industries). A measure which sensitively reflects activity leads to sound productivity indexes; a measure which emphasizes end products is particularly relevant to "welfare" problems. Activity measures based on "subproducts," on the specific outputs associated with arcs of the process cycle, would have many virtues — like invariance to changes in degree of technical integration and applicability to some cases in which heterogeneity of end products precludes satisfactory measurement. Subproduct indexes, however, would require voluminous data not generally available.

End-product indexes cannot be interpreted quantitatively as ratios of "volumes of utilities," and the so-called "economic" theory of index numbers discourages numerical comparisons. The mythical appraiser or "macrotypes" implied by the quantitative interpretation of an index is very unlike the rational economic man; his behavior is characterized, for example, by constant marginal rates of substitution and the coincidence, not the tangency, of his indifference surfaces and "price" hyperplanes. The macrotypes underlying the "free composition" index, the logical extension of the aggregative index to the case in which some products have zero quantities, is regarded here as more plausible than the one underlying the chain index. The former measure, for all its unconcealed arbitrariness, merits consideration as an alternative to the latter.

* Microfilm copy of complete manuscript of 113 pages, \$1.41.
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Output indexes based on end products, reduced aggregates, and subproducts can differ significantly, but the usual gross measure always lies between the net output index based on reduced aggregates and the index of input of materials, etc. There is no necessary relationship between the subproduct index and any of the others. Coverage adjustment of a gross index can sometimes lead to a result lying outside the range of actual relatives.

Productivity measures derived as quotients also need not be internal means. Though an index of net output per unit of composite factor input necessarily lies among the net productivity relatives for individual factors, it may lie outside the range of gross productivity relatives. A quotient measure of labor productivity is factorable into the product of an aggregative productivity index with labor weights, which must be an internal mean, and an index showing the shift in structure of output. Such a quotient measure reduces to a mean when the four aggregates are consistent in scope and structure and two of them cancel. Index systems relating to production, productivity, and other entities may be formulated which satisfy the internality and other algebraic conditions.

Among other features of this study are the elucidation of the plural meaning of aggregates, so important to the understanding of deflation and other processes involving indexes; the development and criticism of formulas for partitioning changes in input, productivity, etc. into "causal" components; and the application of weighted correlation coefficients and other algebraic tools to analysis of the difference between alternatively weighted indexes.

EVALUATION OF CERTAIN SYSTEMS FOR DIFFERENTIATING MARKET QUALITIES OF SOYBEANS

(Publication No. 2748)*

Vincent Irving West, Ph.D.
University of Illinois, 1951

Quality is one of the principal external characteristics of every market transaction. The quantity, the price, and the services concomitantly performed are other such characteristics. These characteristics are interrelated, but each of these interrelationships may be examined separately. The quantity-price relationship has been studied for many commodities and on both theoretic and empirical grounds. The quality-price relationship, which is the subject

* Microfilm copy of complete manuscript of 195 pages, \$2.44. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-489.

of the present study, has been less thoroughly studied. The problem to be examined is that of finding a set of specifications which will reflect variations in value among lots of soybeans.

When lot prices are competitively determined quality is identified with and defined in terms of those characteristics of the lots which appear to influence price. When they are not competitively determined quality must be defined in terms of technical specifications. In the latter case, which is important in the market for soybeans, the question to be investigated is: "What price differentials should be associated with various differences in the specifications?" In the former case, which has been more common in quality studies, the question to be studied is: "What price differentials have been associated with various differences in the specifications?" In this case the significance of any particular specification is appraised from the price data, but in the case of the non-competitively determined prices external evidence of significance must be found. For soybeans this evidence is found in the relationship of the specifications (grade factors) to the chemical composition.

Total variation in the oil content of soybeans having been analyzed into that directly due to the amount of moisture in the soybeans and that due to variations in the composition of the dry matter, linear regression analysis was used to predict the latter. The correlations were too low to permit precise estimation of the effect of variations in each grade factor on oil content.

The effect of the current inspection and discounting procedure is measured by the difference between bids for No. 2 soybeans and the prices actually paid for the soybeans. A sample of 211 carloads from the 1948 crop was collected and analyzed. The total cost reduction due to price discounts was just over \$400, or .05 percent of the total value. Weight discounts for dockage and foreign material amounted to .39 percent of the total weight. The effect of both sets of discounts in 1948 was so small that doubts exists as to whether this extent of quality differentiation results in benefits equalling the cost of the inspection procedure.

The revisions in soybean pricing most needed to achieve efficient differentiation of quality are: 1) the elimination of test weight and splits from the inspection procedure, 2) the introduction of full-scale premiums and discounts for moisture and foreign material, and 3) the revision of delivery provisions of the exchange rules so as to make soybeans deliverable there on the same basis as in the processor market.

EDUCATION

A CRITICAL STUDY OF GRAPHIC RATING SCALES

(Publication No. 2702)*

Neal B. Andregg, Ed. D.
Michigan State College, 1951

This thesis presents the results of an analysis of ratings on six traits by use of graphic scales which were made by students and instructors on the performance of student officers. The traits rated were Thinking, Knowledge, Initiative, Cooperation, Organizing Ability and Expression. Subjects of the study were officers attending the Air Command and Staff School of Air University. These officers participated in the planning of tactical and strategic air operations and rated each other's performance and were rated by their instructors, also officers, who devoted full time to observation and rating.

Method of Study

Students and instructors were assigned to staffs at random. Analyses of variance were completed in which performance ratings made by a given staff of one of their group serving in a particular position were compared with performance ratings of other officers serving in the same position in other groups. This same procedure was used to study ratings made by instructors.

Twelve analyses of variance applying the method of unweighted averages based upon disproportionate sub-class numbers were made of average trait ratings given by students and instructors to officers serving in the several staff positions in each problem.

Reliabilities of students' ratings were computed in each problem for each trait by dividing each staff's ratings of a particular officer's performance into two groups and correlating the mean ratings of each. Reliabilities of instructors' ratings were obtained by correlating their ratings on individual officers for two successive days.

The ease of rating performance on each trait and in each staff position was studied by comparing the number of ratings made with the number of ratings expected.

Ratings on each trait were correlated with each other and with the composite. Multiple correlations with composite ratings were computed to determine if ratings on fewer traits would yield substantially the same results as composite ratings.

* Microfilm copy of complete manuscript of 152 pages, \$1.90.
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Conclusions

1. Differences in the performance of officers serving in a staff position as measured by fellow staff officers' and instructors' ratings cannot be attributed to chance alone.
2. Instructors and students had a tendency to rate officers serving in key staff positions more leniently than they rated their subordinates.
3. Students rated their fellow staff officers more leniently than did instructors.
4. There was interaction between instructors' and students' ratings on all traits except Expression. Interaction increased with experience in the staff problems.
5. Students found it easier to rate the performance of fellow officers serving in positions of importance than that of those serving in minor positions.
6. Both instructors and students had more difficulty in rating students on Organizing Ability than on any other trait.
7. Students and instructors rated most reliably on Expression and least reliably on Thinking.
8. Although the reliabilities of instructors' and students' ratings on most traits were relatively low, the reliabilities of their ratings on Initiative, Organizing Ability, and Thinking combined and on the composite of the six scales were substantially higher.
9. Intercorrelations of ratings on the six traits were high thus indicating the presence of halo.
10. Ratings on Initiative, Organizing Ability and Thinking produced the highest multiple correlations with composite ratings in most instances. Reliabilities of composite ratings on these three scales compare favorably with reliabilities of composite ratings on all six scales.

**A COURSE OF STUDY IN APPLIED SCIENCE
FOR MACHINIST APPRENTICES**

(Publication No. 2750)*

Aaron Axelrod, Ed. D.
New York University, 1951

The purpose of this investigation was to prepare a course of study in science directly related to the operations usually performed by machinist apprentices during their term of internship.

The need for a functional knowledge of the principles of science by apprentices in the machine shop for the complete understanding of operations performed on machine tools and of the materials used in the shop has never been questioned. Many apprentice-training programs included such courses in applied science long before the National Apprentice Act was enacted and the Federal Government has prescribed applied science courses for most trades to be taught in federally-aided schools.

The approach used in this study was that of an analysis of the machinist's trade. Friese¹ states that the process of "analysis is a basic procedure of course making." Since the study is one of course making, this procedure was adopted.

The course of study developed in this investigation included only those principles of science that were found in the analysis of the trade in the fields of physics, chemistry, and metallurgy.

The first step, therefore, in the preparation of the course of study was the formulation of a trade analysis of the machine trade. Since there are many such analyses currently in use in industry and schools having apprentice-training programs for machinists, it was decided to use these so that a composite trade analysis could reflect all of the skills being taught by industry and schools to their apprentices.

Requests were made of industries and schools for their trade analyses. Thirty-nine such analyses were received and studied.

The next step was the collating of all the skills listed on the separate analyses and a notation of the frequency of each skill or operation.

This analysis was then submitted for validation to an advisory

* Microfilm copy of complete manuscript of 377 pages, \$4.71. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-490.

1. John F. Friese, Course Making in Industrial Education, Peoria, Illinois, The Manual Arts Press, 1946, p. 116.

committee consisting of three industrial machine-shop foremen and three machine-shop teachers in industrial and technical high schools.

In order that the science implications could easily be determined from the trade analysis, operation sheets were constructed. This consisted of taking each operation and listing the various steps necessary for the performance of that operation. When this was completed, the operation sheets, numbering 204, were submitted to the advisory group for study.

After the operation sheets were acceptable to the advisory committee, an analysis of each step on each operation sheet was made for science implications. Only the principles of science from the fields of physics, chemistry, and metallurgy were considered.

This analysis of science implications was submitted to another committee consisting of three teachers of applied science in vocational-industrial and technical high schools. Suitable criteria were established for guidance in this phase of the study.

Upon a study of the science principles identified, it was noted that they fell into what are usually called science topics. Such topics were Electricity, Heat, Magnetism, Simple Machines and others.

Upon the advice of both the advisory committee and the special committee of applied-science teachers, these topics were expanded into a teachable order; e.g., from the simple to the complex. Suitable criteria were adopted for this procedure.

The end result is a course of study in science consisting of principles directly related to the operations usually performed by machinist apprentices during their term of apprenticeship.

The course of study developed may be used either by the shop teacher at the time when that information is needed by the apprentice, or by the science teacher in the classroom. Any portion may be given at the time when that part is necessary for the complete understanding of the operation, machine, or materials being used. There are many science principles included which are not directly dependent upon previous principles for their understanding, making the course flexible and usable at any period during the internship of the apprentice.

**A STUDY OF THE GROWTH AND DEVELOPMENT
OF THE TEACHER TRAINING PROGRAM FOR
VOCATIONAL-INDUSTRIAL EDUCATION IN CONNECTICUT**

(Publication No. 2751)*

Robert Edward Bateson, Ed. D.
New York University, 1951

Statement of the Problem

The primary purpose of this study is to investigate the growth and development of the teacher training program for vocational trade and industrial education in the State of Connecticut in order to determine the major forces, events, and personalities that have contributed to this growth and development.

This study should contribute significantly toward a background of understanding that may well prove the fitness of teachers serving in the vocational-industrial program in the schools of Connecticut. It may also lead to an understanding of the need for professional study required to enhance the teaching of a skill with other social and civic values for a full living.

Procedure

The main problem was divided into sub-problems in order to present a necessary background and to facilitate the analysis.

Data were obtained from the several departments of the State Department of Education, state and local libraries, State Labor Department, Connecticut Manufacturers Association, Connecticut Development Commission, newspapers, personal files of trade school directors, and personal interviews.

Summary

Connecticut, in the beginning, was an agricultural and pastoral state. The glacial soil, extensive farming, and increasing population led to rapid emigration. Although Connecticut lacked industrial assets, this only increased the resourcefulness of those who chose to remain.

Early in the nineteenth century, Eli Whitney and Simeon North began the fabrication of firearms using accurate, interchangeable parts. This was the beginning of the modern mass-production system which entails specialized machines and skills.

By 1850, there were more than 50,000 persons working in Connecticut's factories. From 1850 to 1900, Connecticut's industrial

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employment expanded 248%. Connecticut's manufacturing labor force increased by 118,000 for the period 1900-1950.

The economic philosophy of manufacturing "goods for sale" as against the custom of making "goods for use," stimulated the demand for more goods and this stimulated invention. Invention brought the power machine and specialization. These factors, in general, ruled out the master-apprentice relationship as it had existed under the handcraft system of industry.

Connecticut was faced with the problem of training apprentices since her existence depended upon a continual supply of highly skilled tradesmen. The Governor of Connecticut, on June 3, 1903, appointed a commission to investigate practical means and methods of developing a program of industrial technical education. This investigation culminated in the action taken by the General Assembly of 1909 whereby in 1910, two State Trade Schools were established, one at New Britain and one at Bridgeport. There are now twelve trade schools with an enrollment in the all-day classes of 4,754 students with 230 instructors as of June 1950. The total enrollment of all types of classes was 17,066 students with 477 instructors.

In the beginning, the directors of the several trade schools were subjected to certain instructions in teacher training and they, in turn, organized teacher training classes for their own instructors.

A curriculum leading to the Bachelor of Science degree in vocational-industrial education was established at the Teachers College of Connecticut in 1940.

State policy does not require a degree but encouragement and time off were given to those instructors who would pursue it. This stimulated 114 instructors to obtain Bachelor's degrees and 27 to obtain Master's degrees.

Observations

There should be:

1. Further criteria used in the selection of trade instructors.
2. Visitations made to industry and other schools by instructors.
3. Courses of study including shop layouts, trade school problems, technical workshop, and practice teaching in the present curriculum.
4. A better controlled salary schedule.
5. More supervision.
6. Higher qualifications for instructors.
7. A re-examination of trade time schedules.
8. A study made of graduate programs.
9. An experimental trade school.

AN ANALYSIS OF SWIMMING ABILITY AND ITS RELATIONSHIP TO CONSTITUTIONAL BODY PATTERNS

(Publication No. 2752)*

Edith Helen Borneman, Ph. D.
New York University, 1951

The purpose of this investigation is to determine and analyze the inter-relationships of the basic elements, skill components, and total performance of the crawl stroke with constitutional body patterns.

The basic elements are considered as fundamental ingredients underlying the skill components of the crawl stroke. The skill components are considered as the specific techniques which underlie total performance in the crawl stroke. Total performance is the actual swimming of the crawl stroke for a distance of sixty yards against time.

The constitutional body patterns as identified by the somatotype technique involves photographing the subject from three angles (anterior, posterior and lateral). An inspection of these photographs by a trained somatotyper reveals the strengths of the three morphological components of endomorphy, mesomorphy and ectomorphy.

After all data on the basic elements, skill components, total performance and the constitutional body patterns had been collected on the forty-five women college students participating in this investigation, the following statistical techniques were used.

Zero order correlations were computed between the basic elements and total performance and the skill components and total performance. Inter-correlations were computed for the basic elements and skill components separately and together.

Multiple regression equations using the Doolittle Method were computed for the basic element tests and skill component tests to determine the combination of elements and skills which yields the best correlation with the total performance criterion.

The standard error of estimate was determined for the basic elements and the skill components to determine the degree of accuracy with which predictions of the total performance criterion from these equations might be made.

The probability analysis was computed to determine the relationship between constitutional body patterns and ability in swimming the crawl stroke. The data for each of the three morphological

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groups were analyzed, as well as that for the morphological groups when the primary and secondary components are taken into consideration. Interpretations of the probability value are made on the 1% level of confidence.

As a result of the analysis of data collected in this investigation the following conclusions may be drawn:

1. The composite score of the skill components has a greater relationship with the total performance criterion than the composite score of the basic elements.

2. The basic elements cannot be used to predict ability in the skill components with any degree of accuracy since a high relationship does not exist between these variables.

3. The standard error of estimate for the skill components (9.21) and the basic elements (22.58) are too large to allow for accurate predictions of total performance in the crawl stroke. If predictions are made on the one percent level of confidence, in ninety-nine chances out of one hundred the individual's total performance score would fall within a range of ± 23.8 seconds and ± 58.3 seconds of the total performance estimates.

4. The ectomorphs have better swimming ability than the mesomorphs or endomorphs.

5. The mesomorphs have better swimming ability than the endomorphs.

6. The meso-ectomorphs have better swimming ability than the ecto-endomorphs.

7. The skill components contribute more to total performance of the crawl stroke than do the basic elements. The best contribution to total performance is a combination of the basic elements and the skill components together.

SCIENCE INTERESTS OF JUNIOR COLLEGE GIRLS AS DETERMINED BY THEIR READINGS IN CURRENT SCIENCE

(Publication No. 2874)*

Clyde Moseley Brown, Ed. D.
University of Missouri, 1951

Major Adviser: Ralph K. Watkins

Purpose

The purpose of the study may be expressed in three parts:
(1) to determine the areas of science interests of junior college

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girls, (2) to determine the sources from which they read, and (3) to determine the nature of a science course built upon the interests as expressed in the readings of the girls.

Method of Research

Examination was made of the 10,215 reading reports made by the 217 Stephens College girls from the basic science course who participated in the study. The reports were analyzed to determine the source of each reading report, and to find into which of the twenty interest categories that were derived each reading report should be classified. On the basis of marks obtained in General Biology, the basic science course, groups of students of varying abilities were established to find what influence high, low, or median ability had on the science interests and the selection of reading sources.

Tables were constructed to show the frequency of use of sources of various types and to show the distribution of interests in the twenty categories.

A course outline was made to illustrate the nature of a science course built on interests as expressed in the readings of the girls.

Summary

1. The science interests of junior college girls are largely biological.
2. The interests of the girls are not concerned with the biological field as a whole but are primarily concerned with "homocentric biology."
3. The interests of the girls are not in technical science but in non-technical science.
4. The interests of the girls are low in many of the science areas which are commonly assumed as necessary for general education.
5. There are few interests of the students with high marks that are not shared by those girls with low marks.
6. The junior college girls depend more upon the current news type magazines and in particular those sections of such magazines devoted to "Science" and "Medicine" for their science reading than upon any other type of magazine.
7. The junior college girls tend to read mostly from digests and magazines which present short, concise articles.
8. Technical science publications have little attraction for the junior college girls of the study.
9. The magazines directed especially toward women readers supply relatively few science articles which are read by junior college girls.
10. Junior college girls with the highest marks in General Biology read from a greater variety of publications than do those with low marks.

11. The interests of girls of varying abilities are so much alike that differences in interests need not be taken into consideration in setting up a terminal science course that would appeal to the whole group.

12. The interests of the girls as expressed in their science readings are in the results of the works of the scientists rather than in scientific methodology.

13. The interests of the girls are primarily in those phases of science that have a direct relationship to themselves or to mankind.

14. A science course which might be built upon the categories in which the highest interests were expressed may be inadequate to meet the needs of a general education science course.

Recommendations

1. Other corroborative investigations similar to the present study but using different techniques, to determine the interests of junior college girls.

2. A comparable study for men of the junior college age to determine if there are sex differences in the interests in science.

3. A breakdown of the large interest areas of Health and Disease, Medicine and Drugs, and Physiology and Anatomy (a) to find the problems of health for which junior college girls seek answers, (b) to find the interests of junior college girls concerning diseases, and (c) to find the particular diseases in which junior college girls are interested.

4. Investigation to determine methods of strengthening interests in the areas in which the interests of junior college girls are low.

5. An analysis of current magazines to determine their science content for comparison with the older studies.

6. An investigation of the scientific reliability of the science articles in the general magazines widely read by students and adults.

7. An investigation of the possibility of organizing and teaching a general education course based on the science materials in the general and non-technical science magazines.

8. A comparison of the understanding of scientific methodology and attitudes of students in a general education science course when the course is based on materials taken from current science literature, with students taught in a survey course with traditional textbooks, materials, and methods.

AN EVALUATION AND PHYSIOLOGICAL ANALYSIS OF THE MILE SHUTTLE RUN

(Publication No. 2754)*

Roscoe Conkling Brown, Jr., Ph.D.
New York University, 1951

The purpose of this investigation was to conduct an analysis of performance in the mile shuttle run in order to determine the physiological changes associated therewith and in order to evaluate the event as an index of the endurance performance of young men. The study was done in the Research Laboratory of the Department of Physical Education, Health and Recreation of the New York University School of Education as one of a group of studies sponsored by the United States Air Force to aid in the development of a valid test of endurance.

A review of the literature revealed that whereas the mile run was often used as a test of endurance, there was no physiological evidence regarding its validity. No research of any type has been concerned with the shuttle type of mile run.

Twenty-three young men, 19 - 25 years old, performed the mile shuttle run, 70.4 laps of twenty-five yards distance, at least two weeks after performance in the all-out treadmill run, which was used as the endurance criterion. Physiological data were collected during a 10 minute measurement period before the run and during a 90 minute period after the run. Expired air was collected and pulse rate and respiratory rate were measured. The data were used to compute the following variables: oxygen debt, ventilation volume, pulse rate and respiratory rate return to normal. These physiological variables were similar to variables measured in connection with the treadmill run.

In order to describe the physiological responses to the mile shuttle run, the physiological data were related to two indices of mile shuttle run performance (total performance time and drop-off index). Product-moment correlations were computed for the sample as a whole and for each third of the distribution, ranked according to mile shuttle run time. The significance of the differences between mean values of the physiological data for the upper and lower thirds of the distribution was determined by using a technique involving comparison of mean standard scores. Next, mile shuttle run and treadmill physiological data were related. Product-moment

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correlations were computed for the sample as a whole and for each of three endurance levels, determined by treadmill performance order (according to work done). The significance of the differences between mean values of the mile shuttle run and treadmill data was determined by using Fisher's t-test for the sample as a whole and by using comparison of mean standard scores when endurance levels were considered. In the last phase of the analysis, mile shuttle run and treadmill performance were related. The product moment correlations obtained were interpreted to determine the extent to which mile shuttle run performance was an index of endurance performance.

The results of the investigation were:

1. No relationships were found between mile shuttle run performance and the physiological variables studied.
2. No relationships were found between mile shuttle run and treadmill physiological data, with the exception of ventilation volume where a moderate relationship was found.
3. No significant differences were found between the means of mile shuttle run and treadmill physiological responses, thus indicating similarity of response.
4. Low relationships were observed between mile shuttle run and treadmill performance except at the high endurance level where relationships were moderate.

It is concluded that:

1. None of the physiological variables studied are related to mile shuttle run performance.
2. The physiological stresses of the mile shuttle run and treadmill run are similar, but not related.
3. The mile shuttle run does not distinguish between individuals of various levels of treadmill running endurance.

A STUDY OF JOB SATISFACTIONS AND DISSATISFACTIONS OF TEACHERS IN SELECTED SCHOOLS OF INDIANA

(Publication No. 2755)*

Arthur Francis Byrnes, Ed.D.
New York University, 1951

The Problem

The purpose of the study was to discover the reasons teachers give for satisfaction and dissatisfaction in their jobs, and to develop

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from these reasons criteria which secondary school administrators may use in improving the satisfaction teachers receive from their positions.

To do this it was necessary to find out what the literature indicated were the areas wherein teachers found their job satisfaction and dissatisfaction. It seemed reasonable that an examination and comparison of the sources of satisfaction and dissatisfaction of teachers who resigned from, and teachers who remained in their jobs might reveal important information on the problem of teacher job satisfaction.

Method of collecting data

A canvass of the literature on teacher morale, turnover and job satisfaction was made to determine promising areas of study. These areas were: administration, physical conditions, community, faculty, students and parents, and salary and security.

An exhaustive list of questions based on the analysis of the literature was composed. The questions were validated against the opinions of forty-two randomly selected teachers who criticized and rated them. The questions with high ratings were used to formulate a questionnaire.

Financial and other limitations prohibited the study of all secondary schools in the state. A sample of eleven schools was selected based on judgments regarding optimum student enrollment by a panel of professional people experienced in the field of teacher job satisfaction. The sample was tested for adequacy and representativeness.

The questionnaire was sent to all teachers that left or remained in their school during the years 1946 through 1949. The reliability of the instrument ($r .89$) was proved in a study involving the interviewing of sixty-one teachers. The similarity of answers was 91.65 per cent.

Treating the data

Responses for the withdrawn, in-service and total group were recorded and per cents computed. Then the groups were compared. Results were presented in table form accompanied by descriptive and graphic analyses. Differences between in-service and withdrawn teachers were determined by comparing the percentage points of difference between the two groups.

Results of the study

Twenty-three criteria were discovered that teachers reported as affecting their job satisfaction. These were arranged in a checklist which may be used to evaluate teacher job satisfaction in secondary schools.

Fourteen conclusions were stated. They were:

1. Causes for job satisfaction and dissatisfaction were found mainly in the areas of administration, physical conditions, relationships with the community, within the faculty and with students and parents.

2. Two-fifths of all teachers in the study would not become teachers again if given the opportunity.

3. Both groups wanted improved student behavior.

4. Financial return was not the chief cause of job dissatisfaction.

5. Over half of the faculty functions were dominated by the principal.

6. Both groups recognized the need for improved school plant and equipment. The withdrawn teachers felt the lack of these factors more keenly than the in-service teachers did.

7. Faculty meetings were not interesting to teachers. The withdrawn teachers enjoyed them less than the in-service teachers.

8. The type of supervision was not desirable. The withdrawn teachers felt this to a greater degree than the in-service people did.

9. Teachers that withdrew received less salary than those that remained.

10. In-service teachers were more satisfied with administrative relationships than were the withdrawn teachers.

11. In-service teachers were more a part of the community than were withdrawn teachers.

12. In-service teachers felt more secure in their jobs than did the withdrawn teachers.

13. In-service teachers felt they were accepted by the faculty to a greater degree than the withdrawn teachers.

14. Withdrawn teachers advanced more reasons for their job satisfactions and dissatisfactions than the in-service teachers.

**SOME CHANGES IN MISSOURI PUBLIC SECONDARY SCHOOLS
SINCE THE CLASSIFICATION AND ACCREDITATION PLAN
WAS INITIATED**

(Publication No. 2875)*

Gilford White Crowell, Ed. D.
University of Missouri, 1951

In this study an attempt is made to discover and compare certain changes in Missouri public secondary schools, since the classification and accreditation plan was initiated. The major part of the data used in this study was derived from the 1947-48 and 1950-51 Annual Reports to the Missouri State Board of Education. In addition to the data provided by these annual reports, a total of 470 questionnaires were obtained from public school administrators furnishing supplementary material used in the investigation. The schools included in the study were divided according to enrollment into large, medium-size, and small high schools, referred to in this study as Group "A," Group "B," and Group "C" schools, respectively.

The report is presented under seven major divisions, namely: comparison of certain selected aspects of boards of education, superintendents, salary schedules, improvements, and pupil records; comparison of certain selected aspects of secondary school principals; comparison of certain selected aspects of secondary school teachers; comparison of the program of offerings; comparison of the services offered by the schools; description of the opinions of school administrators in relation to the classification and accreditation program; summary, conclusions, and recommendations based upon the findings of the study.

Some of the more pertinent findings of the study are the following:

1. In most of the phases surveyed in this investigation, the greatest increases were reported by the Group "C" schools.
2. An increasing number of Missouri schools are making available written rules and regulations.
3. An increasing number of Missouri schools are making available a written statement of philosophy and objectives.
4. The qualifications of superintendents in the state have improved, as indicated by the increasing number who hold the Master's degree.

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5. The salaries of superintendents in the state have increased, as indicated by a 25.0 per cent increase.

6. An increasing number of Missouri schools are utilizing a single salary schedule.

7. Superintendents are generally spending less time in classroom instruction than was the case in 1947-48.

8. A large majority of the Missouri schools improved or added to their school plants and sites during the three year period 1947-48 to 1950-51.

9. Pupils records are being maintained by an increasing number of Missouri schools.

10. The qualifications of principals in the state have improved, as indicated by the increasing number who hold the Master's degree.

11. The salaries of principals in the state have increased, as indicated by a 39.0 per cent increase.

12. Principals are generally spending less time in classroom instruction than was the case in 1947-48.

13. The qualifications of secondary school teachers in the state have improved, as indicated by the increasing number who hold a Bachelor's degree.

14. The salaries of secondary school teachers in the state have increased, as indicated by a 16.0 per cent increase.

15. An increasing number of Missouri schools are using a regularly employed counselor.

16. Full time counselors are being utilized by an increasing number of Missouri schools.

17. An increasing number of Missouri schools are offering the various activities included in the extra-curricular activities program.

18. An increasing number of Missouri schools are providing adequate service to care for atypical children, including special classes and special teachers.

19. A majority of the superintendents considered the classification and accreditation program, as a whole, of value.

20. Generally speaking, the superintendents considered the selected phases of the classification and accreditation program of value.

**THE CHURCHES AND THE SCHOOLS: AMERICAN
PROTESTANTISM AND POPULAR ELEMENTARY EDUCATION**

(Publication No. 2803)*

Rev. Francis Xavier Curran, S. J., Ph. D.
Columbia University, 1951

A revolutionary development both in the history of education and in the history of Christianity occurred in the United States during the Nineteenth Century. This was the relinquishment by American Protestantism of the traditional claim of the Christian Church to control popular elementary education. The present study, based on the journals of denominational congresses and the more important denominational periodicals, investigates this cession by Protestantism to the State.

After the drive for popular education developed in the second quarter of the Nineteenth Century, most of the major American churches endeavored to create systems of parochial schools. Specifically studied is the movement for parochial schools among the Episcopalians, the Dutch Reformed, the German Reformed and the Quakers; reference is made to the schools of the Lutherans and the Presbyterians. The efforts of all of these churches to control the elementary education of their children failed, due to a common series of causes: lack of pupils, lack of teachers, lack of financial support, lack of strong interest in parochial schools, lack of strong leadership, lack of strong faith in specific sectarian dogmas.

The churches just mentioned did not, for the most part, formally reject the claim of the Christian Church to control popular elementary education. Finding it impossible adequately to implement that claim, they allowed it to fall into desuetude.

A different course of development was followed by Evangelicalism, numerically the most important section of American Protestantism. While Evangelical Quakerism followed the course of the other branches of Protestantism, the Calvinistic Congregationalists experienced an evolution of opinion on the control of popular elementary education very similar to that of the Methodists and Baptists. None of these churches ever attempted, or even seriously considered, the creation of systems of parochial schools. While at first seeking a measure of informal control, and while conceding the right of other churches to establish parochial schools, these churches were content to have formal control exercised by the

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State. Later in the century, however, these churches, due to their reaction to Catholicism, explicitly denied the right of the Christian Church to control popular elementary education and reserved that right to the State.

CONNECTICUT TEACHERS' NEEDS FOR IN-SERVICE EDUCATION

(Publication No. 2756)*

Charles Herger Dent, Ed. D.
New York University, 1951

This project was planned as a handbook of information for use by the people of Connecticut in re-planning a comprehensive, state-wide program of teacher education particularly at the in-service level. It was part of a cooperative study of the educational study for the State carried on by the Governor's Fact-Finding Commission on Education in 1949-50, and was sponsored by a state Committee on the Need for Graduate and In-Service Training Programs.

Normative survey research methods — personal visits, interviews, and questionnaires — were used in gathering the data used in studying this problem: To determine the needs for in-service education of the public school teachers of Connecticut and to make recommendations for meeting certain of these needs through the programs and services of the public and private teacher-education institutions of the state. In this study the proposition is accepted that personal interests and needs, voiced by teachers in service, are the demands of the profession.

There is much detailed information presented in tabular and anecdotal form under these topics: historical development of teacher education; present opportunities provided for teachers' professional growth in service; present status of teachers' preparation; teachers' identification of their general and specific needs for professional growth and development; teachers' suggestions for professional growth activities and suggestions for improving such offerings; laymen's responses to selected questions such as: What kind of a teacher do you want for your child? What do you think can be done to help teachers who are already on the job to continue to grow professionally?

The investigation indicates that Connecticut's number one problem is to establish an integrated program of teacher education that

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will meet the general and specific needs of its in-service teachers. For such a program to be effective, the State Department of Education will need to revise its program in light of the new needs in teacher education. The state at the same time should encourage all private institutions approved for teacher preparation to keep step with this development so as to have a unified state program that takes into consideration: the outer limits of teachers' experience and provide diversified activities for teachers with meager or extensive teaching experience; the degree background of teachers and make provisions for achieving professional standards; the needs of teachers who once met existing professional standards but now find themselves to be substandard; the rising professional standards held out for teachers and make every effort to make adequate opportunities available to achieve such standards; teachers' reasons for not studying further and plan to meet their personal needs as well as their professional needs.

Since there are so many implications in this study for the pre-service preparation of teachers, it was suggested that two further steps be considered: that of providing a five year curriculum of teacher education in all state institutions; and that both elementary teachers and secondary teachers alike be prepared in these institutions.

From the results that are itemized in general and specific professional needs, teacher institutions should evaluate their programs in terms of their effectiveness in helping teachers to meet the demands of modern curricula. The judgment of teachers, apparently, is that methods once considered adequate are no longer effective in meeting the demands of today's schools. It seems that the central implication of this study is that teachers do not need more of the same kind of preparation they have been receiving. In the same sense that teachers have been challenged to find new ways of meeting the interests, needs and abilities of their pupils, teacher-education institutions are being challenged to find new ways of promoting professional growth among teachers in service.

**THE TEACHING OF INDUSTRIAL ARTS IN THE SECONDARY
SCHOOLS OF TEXAS: AN INVESTIGATION OF THE PROGRAM
AND THE PRACTICES EXAMINED IN THE LIGHT
OF AIMS AND OBJECTIVES**

(Publication No. 2758)*

Joe Harold Farmer, Ed.D.
New York University, 1951

The problem of this study is an investigation of the industrial arts program which was carried on in 114 four-year public high schools of Texas during 1948-1949. The introduction contains a discussion of the problem's significance and a review of related studies which were conducted in various parts of the United States during the period of 1936-1942. Also, a survey of the general objectives of industrial arts education, as related to meeting the needs of youth, is included. The ten educational needs of modern young people, as interpreted by the Planning and Executive Committees and the Implementation Commission of the National Association of Secondary-School Principals, are used as criteria by which the objectives of industrial arts are measured. This comparative discussion attempts to show that industrial arts education is designed to contribute to the realization of the general objectives of education, and to meet the major needs of youth.

Since the present study concerns Texas specifically, the objectives of the industrial arts program for the high schools of the state are included. Data for this discussion were obtained from the most recent bulletins from the State Department of Education. From these sources, information was obtained on state regulations, restrictions, standards, and aids available for the industrial arts program during the period of 1938-1948.

In addition, a proposed standard by which the industrial arts program in Texas can be evaluated is included. These criteria were selected from the 1941 tentative issue of the Industrial Arts Steering Committee of New York State.

In the main discussion, consideration is given to the following phases of the industrial arts program in the high schools of Texas during 1948-1949: (1) the teacher; (2) contents of the industrial arts program; (3) the plant and its equipment; and (4) the teachers' opinions relative to their academic efficiency, the adequacy of their respective programs, and the adequacy of aid supplied to industrial

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arts teachers by the State Department of Education. These data were obtained by means of questionnaires submitted by 114 teachers. A double-check was effected when the investigator visited thirty-one schools which represented the various sections of the country and the various types of communities which comprise the state's population.

An analysis of data led to the following major conclusions:

1. The aims and objectives of industrial arts coincide with the aims and objectives of general education, but the industrial arts program in Texas did not meet the specific aims and objectives to any large degree.

2. Few aids were available from the State Department of Education for industrial arts teachers in Texas during 1948-1949.

3. A majority of the teachers of industrial arts in Texas had less than sixty hours of college credit in industrial arts, and many did not meet the state's minimum requirement.

4. The industrial arts standards, regulations, and restrictions in Texas are not adequate enough to provide a well-rounded program for the state, and the individual programs are not complete enough to meet desirable objectives.

In the concluding part of the present study, the investigator surveys the industrial resources of Texas and shows the relationship between industries and industrial arts. Finally, he recommends a proposed industrial arts program which is designed to meet the existent needs of youth in the high schools of Texas.

AN ANALYSIS OF THE FACTORS LEADING TO CURRICULUM CHANGE PROVIDING FOR GENERAL EDUCATION IN SELECTED JUNIOR HIGH SCHOOLS

(Publication No. 2759)*

Helen M. Flynn, Ed. D.
New York University, 1951

Assuming that many educators working at the level of the junior high school are groping for techniques that will "spark" a move for curriculum change which is directed toward the aims of a general education program, the investigator conducted this study to search for techniques for curriculum change. The data collected and analyzed were obtained from a review of the related literature, from visits made by the investigator to ten selected schools and

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from studies made of all written reports in the selected schools which related to operation for curriculum change. In the states of Connecticut, Delaware, Maryland, New Jersey and New York, the State Commissioner of Education was asked to recommend to the investigator for visitation two junior high schools working on programs of general education.

From an analysis of the data collected, the following factors may be listed as having played a role in giving impetus to programs moving toward curriculum change in the selected schools.

1. State departments of education may provide help in spearheading organization for educational planning both at the state and local levels.

2. School surveys provide a technique for exploring problems within schools with a view to finding solutions or improved ways of meeting the existing problems.

3. Workshops may be organized to provide an opportunity for groups of individuals concerned with curriculum planning to work together in in-service programs and explore areas wherein constructive changes may be made.

4. Relating the work of a school or a classroom to the activities of a special project, such as the Citizenship Education Project, which has its origin outside the school may exert an influence in giving impetus to programs of curriculum change.

5. The inauguration of programs to encourage teachers to study findings in the area of child development may be an approach to promoting desired curriculum change.

6. Committees of professional persons who study cooperatively ways of meeting more constructively the needs of students may be a means of moving schools ahead into programs of curriculum change.

7. Grade level meetings of professional persons concerned offer within the individual school the opportunity for a type of specific educational planning which may give direction to desired objectives for change.

8. Visitations to observe and study the curriculum activities of schools other than the ones in which professional persons are employed may be a factor in inciting individuals to take the initiative in developing programs of curriculum change.

9. Services rendered by consultants who represent institutions of higher education, curriculum specialists working in public schools and resource persons connected with such special agencies as the National Conference of Christians and Jews can provide help in giving direction to programs for curriculum change.

10. The study of community realities as a teaching technique can be basic to the process of implementing goals established for curriculum change.

11. Teacher-pupil planning offers opportunity for curriculum change which relates to the needs and problems of youth in school.

Throughout the study it was recognized that the process of curriculum development involves complex problems in human relationships. Therefore, it was considered necessary to analyze those methods and ways individuals worked together which gave promise of facilitating programs of curriculum change. The following methods of group work were observed to offer promise for curriculum reorganization:

1. In planning for curriculum change, all members of the professional staff, youth in school and lay citizens in the community need to be given wide opportunity to participate.

2. Beginning reorganization of the curriculum from the problems faced in schools and then seeking to find solutions for those problems which have been identified may be an effective approach in initiating curriculum change.

3. Individuals within a group organization need to arrive co-operatively at the goals to be sought in the program for change.

4. Continuous attention needs to be given to helping all persons affected by change understand what is going on as curriculum development progresses within a school.

5. Curriculum change does not necessarily imply sweeping reform. In many cases it is the concrete changes which can be made within the existing framework.

6. Belongingness, participation, status and security are basic emotional needs which merit attention as collections of individuals are organized to work toward curriculum change.

On the basis of evidence made available by this study, the investigator concludes the above factors to represent constructive techniques and principles to be considered in moving toward the desired objectives of educational reorganization.

**A HEALTH GUIDANCE PROGRAM: A STUDY
OF THE DEVELOPMENT OF A HEALTH GUIDANCE PROGRAM
FOR STUDENTS (MALE) ATTENDING THE EVENING SESSION
DIVISION OF THE COLLEGE OF THE CITY OF NEW YORK**

(Publication No. 2760)*

Herman Albert Gawer, Ed. D.
New York University, 1951

The problem of this study is a development of a health guidance program for students (male) attending the Evening Session Division, The College of the City of New York. The introduction contains a discussion of the problem's significance in terms of several specifically stated sub-problems; its significance in terms of a re-emphasis of several of the elements of guidance practices, which have a direct bearing on the need of the student, for the purpose of establishing wholesome and worthwhile habits of healthful living; and its clarity as expressed in terms of several definitions of Health Guidance.

Related materials were obtained from: (1) literary citations, (2) program practices as found in educational institutions; and (3) an analysis of data concerning the essentiality, desirability and the undesirability of elements in guidance which were secured from a selected jury of experts.

Since the present study concerns the male student of the Evening Session Division of the College, it was necessary next, to include a study of the physical limitations of the College, amount and kind of facilities and equipment, number and qualifications of personnel, the amount of time which may be given to the health guidance program, and budgetary allowance. Included also is a descriptive analysis of the evening session student.

In the main discussion, consideration is given to a careful selection of the basic elements of health guidance (used in Part II of this study) from among those elements most frequently found in practical application in educational institutions, as presented in the literature, as indicated essential by a jury of experts, and as budgetary provisions, space, equipment, and staff within the college will permit. They are as follows: (1) Orientation, (2) Medical Examination, (3) Fact Finding Items, (4) Physical Screening Tests, (5) Health Guidance Conferences, (6) Physical Activity Program, (7) Cumulative Records, (8) Student Referrals, (9) Informational

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Hygiene, and (10) Return Medical Examination. A final concern of Part I of this study is a presentation of the administrative practices necessary for the conduct of a Health Guidance Program. In summary they are: (1) that a guidance program must be made to fit the conditions found in individual schools, (2) that it must be built carefully upon sound thinking, (3) that it must be extensive in scope so that few student needs are neglected, (4) that it must involve almost all of the staff, (5) that it must use the best of tools and techniques available, (6) that it must provide individual counselling service, and finally (7) that it must, if it is to succeed, have the support, and encouragement, and the leadership of the administrators.

In Part II of this study, the investigator expressed the foregoing basic elements selected for the Health Guidance Program in terms of objectives based on several philosophical premises: first that the terminal goal or accomplishment of any guidance, must, if it is to be successful strive for student growth and development; and second that the ultimate understanding of the program is to understand what it has to offer or what it intends to accomplish.

Upon the basis of the stated objectives, the program implemented by a manual of instruction intended as a guide for the personnel responsible for its administration is presented. In the concluding part of this study, the investigator has presented sample illustrations of health conference guides, lesson plan guides, informational hygiene outline lecture guides, and a list of visual-aid film guides.

THE CONTROL OF FREE HIGHER EDUCATION IN NEW YORK CITY

(Publication No. 2762)*

Abraham Samuel Goodhart, Ph.D.
New York University, 1951

The Problem and Its Significance

The purpose of this study is to trace the development of the control, by its boards of trustees, of the system of free municipal colleges in the City of New York from the rise of the Free Academy in 1847 to 1949, with a view toward determining the nature and problems of this control and their implications for the future of the municipal colleges. The recent advent of New York State in the

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field of higher education through the establishment of the State University of New York, as well as the subsidy which the State has extended to the municipal colleges, suggests a realignment of responsibility for higher education as it affects both the municipality and the State. In the face of these developments, any light shed on the role and significance of free higher education in New York City will serve a useful purpose in the future growth of the four municipal colleges.

Method of Procedure

The study, especially those phases dealing with the establishment of the city colleges, had to be anchored in the historical and cultural forces of the period. An examination of the historical record was therefore required. The more specific problems concerning the development of the free colleges were examined in the mass of primary sources, consisting of reports, surveys, journals, minutes of proceedings, statutes, and similar data, which were readily available. Out of this it was necessary to trace the broad outline of the development of the city colleges and, at the same time, focus on the significant problems of the controlling boards of trustees. The data, subjected to tests of historical validation and interpretation, were then synthesized into a meaningful picture of the type of control exercised over these colleges. Care was taken to admit to the document only such material as properly fell within the scope set for the study.

Findings

The emergence of public colleges in New York City stemmed from the historical impulses of both local and national developments and was sparked into being by public-minded men. In their one hundred year history, the control of the colleges has passed through three distinct phases: identification with the Board of Education; independent existence as separate boards of trustees, one for the College of the City of New York, the other for Hunter College; and, finally, overall control of the entire system by a single Board of Higher Education. Under the Board of Higher Education the colleges have experienced phenomenal growth. But the pattern of development of the New York City system is strikingly different from the usual development of public higher education in the United States where the state, rather than the municipality, assumes the commanding role in offering free higher education. That situation in New York State is now shifting. The financial burden which the support of the free colleges imposes on the municipality is, under existing conditions, a strain on a budget which has about reached its legal limits. It is difficult to see how, unaided, the city can meet the increasing financial needs of free higher education.

Implications and Conclusions

Since the future development of the municipal college system is dependent in large measure on a more reliable source of revenue than can be provided out of city funds, the indications are that the State will have to assume a degree of responsibility for the city colleges if they are to survive as free institutions. There is evidence that the State is accepting such responsibility. The question remains, however, as to any concomitant modifications of control over the colleges. As yet there are no indications that such changes are imminent. But there is little doubt that more extensive State aid will open a new phase in the control of the city colleges.

THE RISE OF FEDERAL CONTROL IN AMERICAN EDUCATION A RECONSIDERATION OF THE PRINCIPLE OF LOCAL CONTROL IN RELATION TO CERTAIN TRENDS, FORCES AND RELATIONSHIPS IN AMERICAN LIFE AND CULTURE

(Publication No. 2817)*

Dawson W. Hales, Ph.D.
Columbia University, 1951

Statement of the Problem

A reconsideration of the principle of local control in American education in relation to certain trends, forces and relationships in American life and culture.

Method of Attack and General Procedure

The first chapter of the study, because the problem involves a reconsideration of an accepted principle of administrative control, contains a detailed presentation of the arguments for local control as presented by the proponents of this pattern of educational administration. Because one of the assumptions of sociological theory is that societal principles and practices cannot be fully understood without reference to their origin and development the literature covering the period during which the pattern of local control emerged was carefully studied. Special attention was given to the period of American history from 1830 to 1850 because it appeared to be particularly significant to the study.

The basic forms and features of the society and culture of this period which appeared relevant to the problem are presented in Chapter II.

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Certain basic features of the American society in the third decade of this century were discussed in Chapter III to illustrate the proposition that "contemporary" social and cultural conditions are very unlike those which existed at the time the practice of local control in education emerged.

In the following four chapters the changes which have occurred in the systems of educational control since the emergence of the pattern of local control are discussed, i. e., "The Rise of Consolidated School Units," "The Rise of State Control," "The Influence of Professional and 'Pressure' Groups" and "The Increase of Federal Participation in Educational Affairs." These chapters are followed by a discussion of the weaknesses of the system of local control under contemporary conditions.

The concluding chapter contains a reconsideration and refutation of certain of the arguments presented in support of the principle as in Chapter I along with some recommendations for the future of federal participation in public education.

The data for the study was obtained from documents covering the fields of history, economics, political science, education, philosophy and public administration.

The following conclusions were reached:

There is a noticeable trend toward centralization of authority in educational administration.

The contention that an increase of federal participation and control is necessarily a step toward the development of a totalitarian state appears to be largely fallacious.

The argument that the decentralized pattern of educational control in America is a final safeguard against the emergence of a totalitarian state is not borne out by recent historical developments nor does it appear to be a valid evaluation of the influence of the pattern of local control in education upon political developments of this type.

Educational policies even though formulated in Washington by the federal government may be administered under modern programs of decentralized management in localities, states and regions.

If the administration of federally formulated policies is decentralized the merits historically associated with local control need not be sacrificed while certain advantages which are inherent in federal participation may be made available.

Recommendations

The federal government should participate to a greater extent in the formulation of certain types of educational policies. This participation should emphasize the function of professional leadership in influencing educational affairs.

Statutes, when resorted to, should be so phrased that they provide for the decentralized administration of federally established policies.

Statutes should also, when enacted, generally specify minimum standards which localities, states and regions would be encouraged to exceed.

Those statutes which affect such matters as methods of teaching and courses of study should be avoided as a general rule, but when resorted to should indicate broad and general policies which are based upon ethical and moral conceptions of societal welfare.

The members of the educational profession should affiliate either through one or several associations but in such a manner as to wield greater influence in educational affairs at all administrative levels.

The specific problems involved in an increase in federal participation in public education should receive greater attention, especially from the members of the educational profession, in order that the advantages of federal activity may be obtained without sacrificing the merits which have been associated with local control.

A STUDY OF ACCELERATION METHODS IN BASIC COLLEGE SOCIAL SCIENCE

(Publication No. 2705)*

John Oliver Hall, Ed. D.
Michigan State College, 1951

Students in Basic College Social Science at Michigan State College are permitted to take the comprehensive examination for the full nine credit, three term course after one term in class with an A grade and two terms with a B grade. This study compares three groups of students accelerating by such means with an experimental class of students, selected by a social science pre-test, who take the complete Social Science course in one term and a sample of students taking all three terms of the course.

Members of the experimental class obtained significantly higher grades for the course than those accelerating from regular first term Social Science classes, whether in their first or second years in college, and students having all three terms of the course. Little difference, however, was found in the achievement of the experimental class when compared with students accelerating from

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the second term of Social Science, most of whom were in their second year in college.

Part I (150 items) of the comprehensive examination, testing facts and principles, and Part II (150 items) testing application of such facts and principles, were separately analyzed for the four accelerated groups and the one group of non-accelerated students. Scores were obtained for the items on each part pertaining to each of the nine units of the course. The analysis of variance was used to determine those units of the course in which there were significant differences between the five groups. The "t" test was then used to find those groups between which significant differences appeared.

The experimental class was found to be significantly superior (at the one or five percent level) to first term, first year students accelerating from regular classes, on mean scores of seven units (four in Part I, three in Part II), over first term, second year accelerated students on two units in Part II, over second term students (mostly in their second college year) on two units in Part II, and over third term students on nine units (four in Part I and five in Part II). Thus, although the experimental class does not excel other groups on all units of the course, it does on a sufficient number to give support to the practice of a one-term accelerated class of students selected by a pre-test on social science knowledge and understanding.

The analysis of co-variance was used to equate the groups, first, on decile ranking of members on the ACE Psychological examination and next on the Cooperative Reading test. The same significant differences remained in achievement on units of the course, supporting the hypothesis that other factors than intelligence or reading ability are present to account for such differences.

An analysis of the gains made by the experimental one-term class between pre-test and post-test showed greatest gains on those units of the course not specifically covered by high school work.

A questionnaire inquiring into the background factors contributing to an understanding of social science pointed to the influence of other Basic College Courses, organizational and work activity, interest in international affairs, business and finance, and number of books read which have a bearing on social science.

**CHRISTIAN EDUCATION IN NEW JERSEY: A HISTORY
OF PROTESTANT COOPERATIVE RELIGIOUS EDUCATION
IN THE STATE, ITS ORIGIN, DEVELOPMENT AND
RELATIONSHIP TO OTHER MOVEMENTS OF THE TIMES**

(Publication No. 2764)*

Erna Paula Hermine Hardt, Ph.D.
New York University, 1951

The Problem and its Importance

It is the purpose of this study to trace the origin, development and contributions of the New Jersey Sunday School Association, and its successor, the New Jersey Council of Religious Education (since 1945 the New Jersey Council of Churches); and to show their relationship to social, philanthropic, educational and religious movements.

The present period in history seems to be witnessing the re-casting of the social-economic-political patterns of life to which people have become accustomed. Heavy burdens of adjustment fall upon individual Christians who feel the need of religious motivation for the work of building a better world. Churches are re-thinking and re interpreting their message and their mission. Denominations have increasingly been drawn together to seek a common expression of Christianity in order to strengthen their influence in the study and solution of the mammoth "secular" problems of today's world.

The history of a state-wide cooperative program of Christian education, placed in its social environment, should help to interpret the present task of Protestant churches in their cooperative religious endeavors. The story of the New Jersey Sunday School Association and its successors offers concrete case material for the understanding of the problem of cooperative interdenominational religious education. The following specific problems were studied in this connection:

1. The background and nature of American colonial religious education.
2. The outstanding personalities, institutions, and social and religious movements which cooperated in the development of the Sunday-school movement, with special attention to what influence they had in New Jersey.
3. The influences which led to the formation of Sunday-school

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associations in several states, with special attention to developments in New Jersey.

4. The nature of the early New Jersey Sunday School Association conventions and state promotional work, and the leadership which directed the work.

5. New Jersey's contribution to the development of graded lesson materials for the Sunday School.

6. The changes in emphases in Christian education with regard to the dynamics for personal and social reconstruction from evangelistic "recruiting" to growth through experience.

7. The change from the non-denominational to the inter-denominational approach to Christian education supervision.

8. The expansion of the religious education program to include, in addition to the Sunday school, the vacation and weekday church school.

9. The possibilities and limitations of cooperative supervision of Christian education by several denominations as illustrated by developments in New Jersey.

10. Influences of the New Jersey Sunday-school movement outside of the state.

The Historical Background of the Problem

The Sunday-school movement, brought from England, took root in Philadelphia and New York between 1790 and 1815. Ideas from these two centers found their way into New Jersey, where a fertile religious tradition of lay evangelism ("soul-winning"), fostered by a series of revivals, encouraged the growth of Bible-teaching Sunday schools in the state.

In the stirring days of the early national period in American life, many communities formed religious and educational associations, among which were the Sunday-school associations organized in many towns. These laid the ground-work on which the New Jersey Sunday School Association was formed in 1858.

The Method of Investigation and the Types of Data Collected

The historical method of investigation was used for this study. The types of data needed were determined by the specific problems. The records of the New Jersey Sunday School Association, the New Jersey Council of Religious Education and the New Jersey Council of Churches were examined. These included minutes of the Executive Committee and Board of Trustees, minutes of semi-annual and annual meetings, annual reports and yearbooks, programs of the New Jersey School of Methods, and other materials listed in the bibliography of the study. The catalogs of the Newark Public Library and the Union Theological Seminary Library furnished lists

of secondary sources on the history of education and religious education, as well as some additional primary source material.

Authors and materials were checked for reliability. Primary source writers were accepted largely because they were participants in the events they recorded. Writers of secondary materials were checked for experience and training. Data from different sources were compared and differences noted.

The Organization of Materials

The materials of this study were organized either chronologically or topically, or both, for presentation. The report was set up to show the continuity of Christian education from its Hebrew foundation through to the interdenominational cooperative program of today. The Sunday-school movement, led by Christian laymen who sought the salvation of children through Bible-study, is shown to be an integral part of this continuous history. It was on the foundation of the Sunday-school movement that the present cooperative interdenominational religious education movement was built.

Summary of Findings

1. The Protestant cooperative Christian education program is built largely on the pietistic, evangelical and Calvinistic types of Protestantism.
2. The Sunday-school movement in America was related to the revival movement of the eighteenth century, and to the philanthropic, educational and religious movements of the early nineteenth century. Many leaders in public offices, especially in New Jersey, were interested in several of these movements at one time.
3. The increasing separation of religion from education, the growing interest in better-trained teachers for the public-school movement, and the revival of interest in religion in the middle of the nineteenth century contributed to a revival of interest in Sunday-school work and to the formation of state Sunday-school associations by Christian laymen.
4. The early conventions of the New Jersey Sunday School Association reflected the leadership training emphasis of the public-school movement. A number of the leaders in Sunday-school work at this time were, or had been, schoolmen. The work of the state association was promoted through county and township association work. The chief aim of Sunday school work was evangelism.
5. The Newark Association of Infant Sunday School Teachers, formed in 1870, was the source of leadership for the first Summer School of Primary Work held at Asbury Park in 1894. Mrs. J. Woodbridge Barnes of Newark became the first International Primary-Junior Secretary in 1903, and in this capacity she organized and directed the conference which outlined the first Internationally approved graded Sunday-school lessons. Most of the members of

this conference had been associated with the Summer School of Primary Methods in New Jersey.

6. The first Sunday-school objective was to effect a conversion experience through Bible study. With the advent of child-study and psychology, interest developed in the reconstruction of life through guided experiences. In religious education there was a synthesis of progressive education and the evangelism emphasis which developed into the modern program of Christian education.

7. The lay Sunday-school movement is the foundation on which the present interdenominational Christian education movement was built. New Jersey was the first state (1882) to engage a full-time executive secretary to serve the Sunday-school field. Early in the twentieth century a professional denominational leadership in Sunday-school work developed. In 1922 the International Council of Religious Education was formed through a merger of the lay workers (International Sunday School Association) and the denominational leaders (Sunday School Council of Evangelical Denominations).

8. The interest in producing better results in religious education led to the use of more time through vacation and weekday church schools in the twentieth century. The extended time offered by these schools made a broader curriculum, a paid leadership and higher standards possible. One of the first and most outstanding laboratory schools for training vacation school leaders was established at the New Jersey School of Methods in 1925.

9. In 1924 the New Jersey Council of Religious Education (successor to New Jersey Sunday School Association) was organized, and was accepted by the denominations as their official agency for cooperative Christian education. In 1931 the Methodist, Presbyterian and Baptist churches each contributed a part-time leader to the cooperative staff. In 1942 the Episcopalians added a part-time staff member to the Council. This cooperative staff arrangement has helped to prevent conflict and overlap of work between denominations, provided a sense of program unity, and made possible greater economy and efficiency in cooperative ventures. The greatest difficulty seems to be in deciding how much time a staff member should give to cooperative work and how much to his own denomination. More financial support is needed to supply more leadership.

10. New Jersey initiated a number of activities which became an accepted part of national Sunday-school work. Among the groups and ideas started in New Jersey are:

The Newark Association of Infant Sunday School Teachers organized in 1870

The Cradle Roll department begun in Elizabeth in 1877

The School of Primary Methods at Asbury Park begun in 1894

The Internationally approved Graded Supplemental Lessons outlined at the School of Primary Methods in 1896

The Internationally approved Beginners' Course for the Sunday School, outlined at the School of Methods in 1897

The Graded Lessons Conference, organized in 1906 in New Jersey, to prepare the first Internationally approved graded Sunday-school lessons for all departments

Decision Day, first held in 1896 in New Jersey

Full-time state-employed executive secretary, first engaged in New Jersey in 1882

First state-employed Home Department Secretary in 1896

Cooperative state staff contributed by several denominations in 1931

Recommendations for Cooperative Christian Education

Among the features of the Christian education program, the following offer a challenge to the Protestant cooperative endeavors:

1. Make a frontal attack on secularism as a way of life through effective media of mass communications such as radio, television, motion pictures, posters and brightly written articles in the general press.
2. Further extend the program of Christian education by more intensive use of the Christian family life through home and parent education.
3. Lead people to a personal religious experience which may result in convictions and actions concerning the work of the kingdom of God, the basic Christian personal and social idea.
4. Continue to encourage the use of the Bible as a sourcebook of religious experience, the means of spiritual freedom. In times of great emergency or crisis there can be profit in making sure that the organism of society is not cut off from its nourishing roots.
5. Interpret and demonstrate the newer type of life experience curriculum to help church schools make more effective use of it.
6. Train leaders for local church work through pioneering efforts such as the workshop experience which combines the laboratory school idea worked out at Blairstown, together with a study of principles, philosophy and method of religious education, demonstration and observation school, and a practicum to evaluate what the students observe and do.
7. Revivify the cooperative vacation church school program to make fuller use of the more creative activity approach which sessions of three hours a day, five days a week, four or five or six weeks in summer make possible.
8. Organize more weekday church schools in ways that are still legal under the recent Supreme Court opinion, and which have the advantage of reaching children who are not reached by the conventional work of the Sunday schools on Sundays.

9. Put into the cooperative program the ecumenical emphasis which has received impetus from the formation of the World Council of Churches and the merger of cooperative agencies which resulted in the National Council of the Churches of Christ in the U.S.A.

10. New Jersey and other states that are formed as councils of churches should take special care that the cooperative educational supervision which went forward under councils of religious education are not by-passed but are re-emphasized under the council of churches program. The latter is religious education plus, not something in place of religious education.

Recommendations for Further Study

A number of fields related to the present study bear further investigation. Such studies would add more knowledge to the history of Christian education, present the history of New Jersey in better perspective and make possible a more effective comparison of the contributions of New Jersey with those of other states.

1. A basic one-volume history of New Jersey is needed to present more adequately to the average citizen the history of his state in good perspective.

2. A history of religious education in Connecticut from 1850 to the present time would reveal the development of a council of churches program in another state which has made worthwhile contributions.

3. The contributions of Illinois in the field of religious education would be useful as a study since this state has been the home of the International Sunday School Association and its successor, the International Council of Religious Education.

4. A study of Massachusetts might prove fruitful for the earliest leaders in the state Sunday-school convention movement were from this state, and the public-school education movement had its beginnings there. It would be interesting to discover if there was any relationship between the two movements, as there was in New Jersey.

5. New York state leaders seem to have had the greatest vitality and vision in providing a new type of national convention during the revival period of 1857-1858. New York City and Brooklyn were two local centers where effective Sunday-school work was carried on, especially in institute work and infant-school teacher training. A study of this state might reveal useful information.

6. Pennsylvania has contributed outstanding leadership to the national and world Sunday-school movements. Philadelphia was the first "national" center of the Sunday-school movement during the first-half of the nineteenth century. There is reason to believe that a study of Pennsylvania's history of Christian education would be a contribution.

7. Several counties of New Jersey offer possibilities for studies in various phases of religious educational work. The counties of Essex, Somerset, Hudson, Gloucester and Cumberland seem to offer the best opportunities for study.

8. A study which seems to be much needed is one which would show whether denominations are adequately meeting the leadership training needs of the times in local training classes and summer conferences. There are opinions expressed on one side or the other of the question, whether there is value in reviving community training schools and the cooperative summer school of methods, but there is no scientific, scholarly treatment of the data which are available as to the merits of the various types of leadership education.

9. A history of the world-wide Sunday-school movement, as it emanated from London and Philadelphia, might prove helpful in determining the place of Christian education in the ecumenical movement which led to the formation of the World Council of Churches.

10. A history of the laboratory-school method of training leaders in Christian education would be useful in revealing the beginnings of this method of teacher education by states, denominations and educational institutions. Case studies of selected laboratory schools would help religious education workers understand the possibilities of this type of training and might well stimulate the establishment of more of such schools.

**A STUDY OF SOCIAL STATUS DIFFERENTIATION
IN THE CLASSROOM BEHAVIOR OF NINETEEN
THIRD GRADE TEACHERS**

(Publication No. 2716)*

Arthur John Hoehn, Ph. D.
University of Illinois, 1951

A number of statements have appeared in recent literature to the effect that teachers behave more favorably toward high status than toward low status pupils. To provide a basis for evaluating these statements, a study was made of the classroom behavior of nineteen third grade teachers in two central Illinois communities. Each teacher selected for study was a "middle class" woman in charge of a classroom group composed of both "middle class" and "lower class" children.

* Microfilm copy of complete manuscript of 201 pages, \$2.51.
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Indices of teachers' behavior toward their individual pupils and toward groups of pupils of different status levels were obtained by means of a simplified form of the Anderson-Brewer "Dominative-Socially Integrative" observation scheme. The classroom contacts of each teacher were observed for a period of five hours. In most cases observation was completed over a two day span. Status of pupils was determined by the Index of Status Characteristics devised by Warner, Meeker, and Eells. In addition to the observation and status data, age and achievement data for the pupils and some personal data regarding the teachers were collected.

The specific hypotheses tested were that teachers (1) tend to have more classroom contacts, (2) tend less toward conflict, (3) tend more toward "highly integrative" behavior, and (4) tend to conform more closely to the principles of mental hygiene, with high than with low status pupils. Attention is also given to differences between teachers in respect to the degree to which their behavior is differentiated on the basis of status.

In the main, the analysis for testing these hypotheses is based upon the assumption that the Warner class concepts are valid. However, in some parts of the analysis, status is considered to be continuous, and the Warner social classes are viewed as arbitrary divisions of an unbroken status distribution.

The findings do not support the hypothesis that teachers tend to have more individual contacts with pupils of high status than with pupils of low status. Apparently there is little or no relationship between a pupil's status and the relative amount of attention he receives from the teacher of a particular classroom. On the other hand, the data provide considerable support for the statements that the quality of teacher contacts experienced by high status pupils tends to be better from the mental hygiene standpoint than that of contacts experienced by low status pupils. While the evidence is not always significant statistically, its general trend is clearly in this direction both when the sex factor is controlled and when it is not controlled.

The data provide no accurate indication of the magnitude of the social status differentiation. In general it appears to be small although this is apparently not true for all teachers. At least one of the teachers evidently favors her low status pupils over her high status pupils.

No attempt was made to control all non-status factors. Even determining which factors should be controlled and which should not would be no small task. However, some attention was given to the effects of achievement differences. The evidence suggests that the found tendency of teachers to favor high status pupils over low status pupils may be incidental to the partiality shown pupils of relatively high achievement.

The range of applicability of the results obtained in this investigation is not clear. Further research is needed to determine whether the findings apply to teachers and pupils in other communities and at other grade levels.

A SURVEY OF GUIDANCE SERVICES AND PRACTICES IN MICHIGAN PUBLIC SCHOOLS

(Publication No. 2706)*

Carl Meads Horn, Ed. D.
Michigan State College, 1951

This study was made for the purpose of securing a comprehensive picture of the guidance practices and services in Michigan public schools. A questionnaire was sent to all of the public schools that are classified into four groups in accordance with their sizes.

Very few schools keep adequate cumulative records although nearly two-thirds use the state form CA 39 which provides guidance in the development of satisfactory records. Scholastic aptitude tests are used in approximately two-thirds of the schools. Achievement tests are used in about half of the junior highs and interest inventories are used in about one-third of the schools. Comparatively little use is made of mechanical, clerical and personality tests.

Homeroom programs still exist in approximately one-fourth of the small schools and in over half of the large schools. The Core programs are much less common being found in only one school in seven. Counseling services as measured by time free for that purpose was reported in two-thirds of the large schools and about one-fourth of the small schools. The school administrators indicated that provision of fifty per cent reimbursement would nearly double the amount of counseling services provided.

Organized placement services are provided by only one-fifth of the schools. Nearly half of the schools report some type of follow-up of their graduates and one-fourth of them have studied the causes of drop-outs.

Group guidance activities are widely varied among the schools. Half of the schools provide some organized orientation, one-third teach occupations courses and approximately one-third have courses dealing with personal, social, educational and vocational problems. Career conferences are also held in one-third of the schools, while two-thirds of the schools reported field trips to business and

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industry. Work experience programs for credit were reported by approximately one-third of the schools.

Other services provided in the schools are as follows: nursing services in seventy per cent, medical services in forty per cent, visiting teachers in nineteen per cent, dental services in thirty-one per cent and psychological services in twelve per cent of the schools.

The study shows that there are wide variations in the guidance services provided by the schools. There appears to be a tendency toward the large schools providing more guidance services than the small schools although many exceptions to this may be found.

In general, the author concludes that the majority of schools in Michigan do not provide adequate guidance services. This implies that the teacher training institutions and the Department of Public Instruction must furnish more and better leadership in the field of guidance if the needs of the boys and girls are to be met.

THE ORGANIZATION AND ADMINISTRATION OF INDUSTRIAL EDUCATION ON THE STATE LEVEL

(Publication No. 2886)*

John Wesley Karnes, Jr., Ed. D.
University of Missouri, 1951

Major Adviser: H. H. London

Purpose

To ascertain the characteristics of the professional staff of the industrial education section of state departments of education; to determine what functions are performed by the industrial education section and what functions should be performed; and to study certain issues confronting industrial education on the state level.

Method of Research

Data were obtained from inquiry forms from state directors of industrial education, industrial education teacher trainers, public school superintendents, local directors, and teachers of industrial education at the local level.

Summary and Conclusions

Four hundred nine professional personnel were employed by the industrial education section of forty-two state departments of education in twenty different positions. One hundred forty-three

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additional professional personnel were needed by thirty-one states in eighteen different positions.

Ninety-five per cent of the state directors of industrial education held the bachelor's degree, 62 per cent held the master's degree and 3 per cent held the doctor's degree.

All of the state directors of industrial education reported secondary school teaching experience in industrial education, 72 per cent reported college or university teaching experience in industrial education.

State directors are not as well prepared professionally as industrial education teacher trainers as indicated by the college degrees held by the two groups.

Twelve different official names by which the industrial education section of state departments of education is designated were reported. The term "Trade and Industrial Education" was most frequently reported. Twenty-nine different areas of work with which the industrial education section is concerned were reported by the state directors.

Nine hundred seventy-six educators responded by checking the functions they believed should be performed by the industrial education section of state departments of education. Twenty-one of the thirty-six functions were favored by more than 75 per cent of the respondents and, therefore, are classified as highly desirable. Ten of the thirty-six functions were favored by from 51 to 75 per cent of the respondents and are classified as desirable. Five of the functions were favored by less than 51 per cent of the respondents and are classified as of doubtful desirability.

Specialists in various areas are employed in relatively few industrial education sections. The greatest need for additional professional personnel in industrial education sections is in positions of a general rather than a specific nature.

Official names by which most industrial education sections are designated do not adequately describe the areas of work with which they are concerned. The term "industrial education" would be more adequate.

Functions relating to supervision and apprenticeship are performed by the industrial education section in state departments of education to a greater extent than the functions relating to other services.

Functions concerned with reimbursable phases of industrial education are performed to a greater extent than functions concerned with the non-reimbursable phases.

Functions relating to local assistance, research and apprenticeship which the industrial education section of state departments of education should perform are favored more generally than the functions relating to other services.

Except in small states and states with insufficient population, the organization of states into districts or regions with professional personnel in charge of each will probably facilitate the administration and supervision of the state-wide industrial education program.

Administration and supervision on the state level will be improved by having a single agency in the state department of education administer and supervise all phases of the program of industrial education.

Teachers and prospective teachers of industrial arts and of vocational-industrial education should be permitted to enroll jointly in professional courses in industrial education.

Industrial arts is not being adequately supervised on the state level in most states.

A FIFTH YEAR PROGRAM FOR THE CERTIFICATION OF LIBERAL ARTS COLLEGE GRADUATES AS ELEMENTARY TEACHERS IN CONNECTICUT

(Publication No. 2769)*

Lois Jeannette King, Ed. D.
New York University, 1951

The demand for and the supply of properly qualified teachers for the elementary schools constitute an economic problem with very real educational and social implications. It is evident that a constructive effort should be made to find a source of supply of intelligent and well-qualified young men and women who can be given the essentials of a sound professional program of elementary education in a relatively short time. A significant resource, and one hitherto almost untapped, may be found in the graduates of liberal arts colleges.

The purpose of this investigation was to prepare a fifth year of professional education to be offered to graduates of liberal arts colleges to certify them to teach in the elementary schools of Connecticut.

The task of planning a functional post-baccalaureate program for the preparation of elementary teachers was approached by:

1. A study of liberal arts curricula as revealed in the literature of the field in order to determine typical patterns of liberal arts education.

* Microfilm copy of complete manuscript of 196 pages, \$1.69.
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2. A survey of curricula of ninety liberal arts colleges (30 publicly supported, 30 privately maintained, and 30 church-related institutions of higher learning).

3. A study of transcripts of college records submitted by liberal arts college graduates for entrance into the fifth year program at the New Haven State Teachers College.

4. A survey of post-baccalaureate programs in operation in various colleges throughout the United States.

5. A study of effective practices in the preparation of elementary teachers in selected teachers colleges and schools of education.

6. The formulation of the objectives of such a post-baccalaureate program.

7. A post-baccalaureate program evolved from the findings of this study and the recommendations of outstanding leaders in teacher education, faculty members of the New Haven State Teachers College, superintendents of schools, supervisors, principals, graduates of former post-baccalaureate programs, and students in the current program.

Conclusions and Recommendations

An analysis of the various curricula of liberal arts colleges indicated that "there is no curriculum which is the common possession of graduates of a liberal arts college," since there is no generally accepted philosophy of higher education in this country. Therefore, a program, designed to develop the competencies essential to effective teaching in the elementary school, should be flexible and tailor-made, utilizing the educational background of the student.

The survey of post-baccalaureate programs indicated that a workshop organization, providing an understanding of child growth secured through study and actual experience with children and knowledge of the curriculum materials of the elementary school, was most functional.

A study of effective practices in selected teachers colleges and schools of education revealed the need for flexible and adjustable curricula, emphasizing planned and guided experiences with children as the motivating, coordinating, and integrating factors in the student's academic and professional work.

Involved in the formulation of the goals of a post-baccalaureate program are a number of important psychological, sociological, and philosophical factors and issues. Inherent in all is the development of a dynamic philosophy of education, inculcating the ideals and practices of the democratic way of life as a foundation for the preparation of effective teachers.

Utilizing the recommendations of various planning groups and

following the trend in curricular development, a unified course, The Child and the Curriculum, will become the core of the program. Experience with children in actual classroom situations should provide the prospective teacher with knowledge of the major activities and responsibilities of a teacher.

The proposed post-baccalaureate program will not solve the teacher shortage in Connecticut but will be a constructive effort to alleviate it by providing qualified teachers.

VOCATIONAL REHABILITATION IN MISSOURI, 1945-1950: ITS NATURE, EXTENT, COST AND EFFECTIVENESS

(Publication No. 2889)*

Norbert Koch, Ed. D.
University of Missouri, 1951

Major Adviser: H. H. London

Purpose

To ascertain the background, disabilities, training, earnings, and success on the job of disabled persons in Missouri for the years 1945-50, together with the cost of this service.

Research Technique

The data for this study were obtained from 4,860 closed case reports of the Vocational Rehabilitation Section (General Agency), State Department of Education, and from 553 closed case reports of the Bureau for the Blind, State Department of Public Welfare. To obtain an employee rating, an information blank was sent to employers of rehabilitated persons.

Summary

Of those persons handled by the General Agency, about one-seventh had no work experience, one-third had some work experience in part-time jobs, while more than one-half had work experience in a full-time job. One-twelfth of the clients served by the Bureau for the Blind had no work experience, while three-fifths had a full-time job at time of acceptance.

More than one-half of the rehabilitants handled by both agencies at time of acceptance had received a ninth grade education or less.

More than one-half of the persons serviced by the General Agency were disabled by disease, and more than two-fifths of the

* Microfilm copy of complete manuscript of 243 pages, \$3.04. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-625.

persons served by the Bureau for the Blind were disabled by disease and more than one-third by congenital defects.

Three-fourths of those persons rehabilitated by the General Agency and two-thirds of those handled by the Bureau for the Blind did not require vocational training.

Almost one-half of the rehabilitants handled by the General Agency at time of closure were employed in clerical, service, and skilled occupations, while more than one-half of those handled by the Bureau for the Blind were employed in sales, skilled, and semi-skilled occupations.

Nine-tenths of the rehabilitants were reported by their employers as being average or above when compared with other workers as to wages, interest in the job, cooperation, and job performance.

It cost the General Agency \$399 and the Bureau for the Blind \$856 per person per year to rehabilitate a disabled person. Increased earnings (earnings at closure over earnings at time of acceptance) of rehabilitants handled by the General Agency were \$1,333.50, and of those handled by the Bureau for the Blind they were \$1,014.00.

Conclusions

A majority of the rehabilitants handled by both agencies have previous work experience.

Since the educational level of rehabilitants of both agencies is low, the occupational choice of most individuals with vocational handicaps is limited to occupations requiring training of less than college grade.

More clients of both agencies are disabled by disease and congenital defects than are disabled by employment accidents, the ones for whom the program was originally designed.

Of those clients handled by the General Agency who require vocational training, a majority utilize colleges, universities, or private trade schools; of those handled by the Bureau for the Blind, a majority receive sheltered workshop or home bound training.

Rehabilitants are employed in a wide range of occupations at time of closure; hence it is evident that no area of employment is completely closed to vocationally rehabilitated workers.

Since rehabilitants compare favorably in interest in the job, cooperation, and job performance with other workers, the fact that they have had vocational handicaps does not seem to make any difference once they have been rehabilitated.

It appears that the cost of rehabilitating disabled persons is more than compensated for by their increased earnings for one year, not to mention the alleviation of dependency.

It appears that the program of vocational rehabilitation has proved to be socially and economically desirable.

**AN INVESTIGATION INTO DIFFERENCES BETWEEN
BOYS AND GIRLS IN SELECTED READING READINESS AREAS
AND IN READING ACHIEVEMENT**

(Publication No. 2891)*

Virginia Jacobi Konski, Ed. D.
University of Missouri, 1951

Major Advisers: Paul C. Polmantier and A. Sterl Artley

Purpose

To determine to what extent statistically significant differences exist between boys and girls in selected reading readiness areas and in reading achievement.

Methods of Procedure

A group of first-grade white boys and a group of first-grade white girls, from two cities of Missouri, were chosen for the investigation. The group of boys and the group of girls were homogenous with regard to two variables, chronological age and intelligence, in means and standard deviations. At the beginning of the year, the children were given group and individual tests covering fourteen selected reading readiness areas. Analysis was made of the significance of the difference of the means for the group of boys and the group of girls for each reading readiness area. At the end of the year, the children were tested in four selected areas of reading achievement. The significance of the difference of means for boys and girls in these areas was analyzed.

Summary

1. There were no statistically significant differences found between the boys and girls in this study in the selected reading readiness areas of:

- (a) Language Areas: Articulation, Number of Sentences Spoken, Length of Sentences Spoken, Verbal Facility, Memory Span for Related Ideas, Verbal Meaning
- (b) Auditory Discrimination
- (c) Visual Discrimination
- (d) Perceptual Speed
- (e) Personal Adjustment
- (f) Selected Areas of Physical Development: Height, Weight, Number of Permanent Teeth Erupted, Strength of Grip (translated into Height Ages, Weight Ages, Dental Ages, Grip Ages)

* Microfilm copy of complete manuscript of 133 pages, \$1.66.
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2. There was a statistically significant difference found between boys and girls, in favor of the girls, in the reading achievement area of paragraph reading. There were differences found between boys and girls, in favor of the girls, which closely approached statistical significance in the reading achievement areas of Word Pictures and Word Recognition.

Conclusions

1. There is no significant difference between boys as a group and girls as a group in selected reading readiness areas at the beginning of grade one. In selected reading readiness areas, boys are just as ready as girls for reading instruction and progress.

2. At the end of grade one, there is a significant difference between boys as a group and girls as a group, in favor of the girls, in Paragraph Comprehension. The difference between boys and girls in Word Recognition and Word Pictures is not highly significant, but it closely approaches significance.

Educational Implications

1. There is no need to prolong the reading readiness program for boys as a group, or to raise the age of school entrance for boys. There is no need for a wholesale treatment for boys during the reading readiness period which is different from the treatment of girls. Reading readiness for both boys and girls is a matter of individual differences. The teacher must consider these differences when appraising reading readiness for boys and girls.

2. Since reading readiness factors are not the factors which account for the difference in reading achievement at the end of the year, there may be other subtle factors operating, which the teacher might consider, such as: home environmental factors, content of early reading materials presented to young boys, consistency of early materials with young boys' interests and roles in society, and attractiveness of early material.

3. The prevention of reading disability is a more important educational goal than the cure of difficulties by the establishment of extensive remedial services, from the standpoint of economy of time, effort, money and personal frustrations for many students.

A NATIONAL STUDY OF COUNSELOR CERTIFICATION

(Publication No. 2707)*

**Benjamin Guy Kremen, Ph. D.
Michigan State College, 1951**

This study was undertaken to ascertain the present status of counselor certification in the United States, to identify trends and possible weaknesses encountered under present certification plans, and to obtain the thinking of a selected group of educators from all parts of the country concerning the provisions and requirements they consider desirable in such a plan. The normative-survey method was employed. Original data were secured by means of two questionnaires. One was sent to the entire group; the other was sent to state supervisors of guidance only.

There is a definite trend toward state adoption of counselor certification. To date, twenty-three states have adopted plans; nine are contemplating the institution of plans. Most of the present plans were devised by committees composed of college, public school, and state department personnel. The criteria used most frequently by these committees were study of: (1) the counselor's job, (2) other state plans, and (3) the needs of the state.

Most of the educators sampled favor counselor certification because they see in it an instrument for: (1) professionalizing the field, (2) insuring well-trained counselors, and (3) providing status and protection for the profession.

Three notable differences exist between the provisions of present plans and the opinions of the educators concerning what they consider desirable. The educators would require previous counseling experience, a greater amount of specialized study, and would accept fewer hours of undergraduate work.

A composite certification plan based upon present practice, the opinions of the educators, and a study of the literature would provide for two levels, entry and professional. The requirements and provisions for the professional level would include: (1) a valid teaching certificate; (2) two years of teaching experience; (3) one year of work experience other than teaching or counseling; (4) permanent validity; (5) certain personal attributes; (6) twenty semester hours of study in the areas of Philosophy and Principles of

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Guidance, Understanding the Individual, Occupational and Educational Information, Counseling, Organization and Administration of Guidance Programs, and Supervised Experience in Counseling; and (7) ten additional semester hours in closely related fields.

There is evidence in the study of a need for: (1) clearer definition of the counselor's job; (2) valid criteria for evaluating the counselor's effectiveness; (3) research into personality traits and characteristics which contribute to the counselor's effectiveness; (4) a cooperative screening, training, and certification plan worked out by state department of education, college, and public school personnel; (5) research to determine counselors' effectiveness in relation to their experience and training; (6) research to determine the most desirable elective areas of study to include in a training program; (7) evaluation of existent counselor training programs; and (8) better certification enforcement procedures.

CONTENT AND PROCEDURES FOR A COURSE TO PROVIDE PROSPECTIVE TEACHERS GUIDED LEADERSHIP EXPERIENCE WITH YOUNG PEOPLE THROUGH ACTIVITIES IN GROUP WORK AGENCIES, SUPPLEMENTED BY CLASSROOM INSTRUCTION

(Publication No. 2770)*

Stanton Barber Langworthy, Ed. D.
New York University, 1951

The purpose of this investigation was to develop content and procedures for a course to provide prospective teachers guided leadership experience with groups of young people through activities in group work agencies supplemented by classroom instruction as part of an undergraduate program of teacher education.

The study grew out of recommendations from national educational organizations for the use of direct experiences with young people in the community as a planned part of teacher education so that prospective teachers might be helped to understand themselves, young people, and the community, and develop happy and effective relationships with young people.

In the primary investigations in the study the objectives held in common by certain colleges and group work agencies in providing prospective teachers leadership experiences with groups of young people in group work agencies were learned and used as bases for the content and procedures to be developed for the course.

* Microfilm copy of complete manuscript of 161 pages, \$2.01.
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The content and procedures were then developed through securing the opinions of students, social workers and educators experienced in programs wherein prospective teachers were provided leadership experience in group work agencies. These opinions were analyzed for consistency with the common objectives of colleges and agencies, internal consistency, and feasibility. Content and procedures meeting these conditions were then applied to the course, "School Leadership and the Community," (030.51,52) through one semester. The course was offered in the School of Education at New York University with the cooperation of three group work agencies.

The desirability and effectiveness of the content and procedures were determined through securing the opinions of students, leaders in teacher education, and leaders in social group work, and through collecting evidence of students' gains related to the objectives of the course while the content and procedures were being applied. On the basis of the evidence collected, the tentative content and procedures were revised and qualified and final recommendations were made.

The investigation showed that the major objectives of the colleges and agencies in providing prospective teachers the agency experience were: (1) To help them grow in knowledge of themselves and their relationships with the teaching profession, (2) To help them grow in knowledge of young people, (3) To help them grow in knowledge about and skill in democratic leadership with young people, and (4) To help them grow in knowledge of the community and its influences. The results showed, too, that detailed content and procedures could be developed for a course designed to achieve the foregoing objectives, and that the content and procedures could be applied with reasonable economy of time and effort while maintaining good relationships among all concerned.

The evidence from the study showed that content and procedures developed were reasonably effective in helping students in the course make gains related to the course objectives, and that the content and procedures were considered desirable by the students, social workers, and educators polled.

Since the course objectives were identical with certain objectives for teacher education recommended by many leading educators, since the detailed content and procedures recommended in the study were developed, applied and evaluated more carefully than any others for a course of this kind, since the content and procedures were found satisfactory and effective in achieving the course objectives, and since it was doubtful that prospective teachers could make equal or greater gains solely through experiences in the college classroom, the investigator concluded that New York University should continue to apply the content and

procedures developed in the study to an undergraduate course to be provided prospective teachers early in their professional training. The investigator also concluded that the content and procedures have significance for certain other institutions interested in helping prospective teachers grow in knowledge of themselves, young people, community life, and in knowledge of and skill in democratic leadership with young people.

**A STUDY OF THE FACTORS ASSOCIATED WITH FAILURE
IN THE NINTH GRADE OF THE HEMPSTEAD HIGH SCHOOL**

(Publication No. 2771)*

Edna Thompson Layton, Ed. D.
New York University, 1951

The problem was to discover the factors associated with ninth grade scholastic failures in the Hempstead High School through an intensive study of the ninth grade class of 1949-50 and to make recommendations as to policies and practices to be used in dealing with failure in this school in the future.

A review of earlier studies of failure was made to serve as a check on whether all possible causes of failure were being explored in this study and for comparison purposes.

A picture of ninth grade failure in this school for a period of five years was obtained by an investigation into the number and sex of failing pupils, the percentage of failing pupils coming from each elementary school, the percentage of failure in each subject, the number of subjects failed by each pupil, the Otis Intelligence Test quartiles for ninth grade pupils, the percentage of failing pupils in each quartile, and the distribution of Otis Intelligence quotients for these failing pupils. This inquiry revealed that there was no great change in the number of failures in the ninth grade in this school from year to year. Therefore an intensive study of failure as related to the ninth grade class of 1949-50 was made in order to reveal the factors associated with the failure of its pupils.

This investigation consisted of two parts: (1) an examination of all available records of these failing pupils in order to determine the extent to which each of sixteen conditions was associated with failure, and (2) at least three personal interviews concerning the failure of each pupil — with the teacher, the parent, and the pupil himself. These interviews uncovered other important factors

* Microfilm copy of complete manuscript of 162 pages, \$2.03.
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associated with failure which could only be discovered through personal contact.

It was found that inferior mental ability, over-age, a multiplicity of cultures, position among siblings, physical defects, and previous failure were not important factors associated with ninth grade failure in this school; on the other hand, poor reading ability, socio-economic status, the broken home, excessive absence, poor social adjustment, the course choice, the size of the class, and failure policies of certain teachers seemed to be connected more closely with failure. Interviews revealed such factors as poor study habits, inadequate parental supervision, bad home conditions, and the like.

The recommendations for dealing with ninth grade failure in Hempstead High School included (1) combined study of failure policies and practices by the elementary and high schools, (2) more joint meetings of these school staffs, (3) a change in the method of administering the testing program and planning modifications based on test results, (4) individually tailored programs for slow learners, (5) remedial reading instruction wherever needed, (6) in-service education for high school teachers, (7) plans for closer parental cooperation, (8) special assistance for pupils with personal and social problems, (9) a study to determine if this school is now meeting all the social needs of its pupils, (10) a study to determine if a change in administrative policies with regard to truancy is needed, (11) plans for better health records and closer cooperation between the staff and the health office, (12) a study to determine why two departments are responsible for almost half the ninth grade failures, (13) an evaluation of the present marking system and the establishment of new policies in regard to marking and promotional practices, (14) a change in the final examination schedule, (15) a final yearly report card, (16) a system of pupil coaches, (17) teacher conferences for failure prevention, (18) plans for more complete diagnosis of difficulties, and (19) a greater effort on the part of the entire school staff and parents, working together, in the delineation and execution of methods for helping pupils eliminate failure.

THE CONTRIBUTION TO PROTESTANT CURRICULUM THEORY
OF THE ORGANIZING PRINCIPLE OF THE 1948-49
PRESBYTERIAN "FAITH AND LIFE" CURRICULUM
FOR THE CHILDREN'S DIVISION

(Publication No. 2772)*

Lois Emogene LeBar, Ph. D.
New York University, 1951

The Presbyterian "Faith and Life" curriculum is one of the current attempts to solve the most persistent problems in the field of Protestant curriculum, the problem of achieving a satisfactory synthesis between the content and life-situation theories. This pioneering venture purports to make the Word of God authoritative and redemptive by relating it to the actual needs of everyday living.

The criteria used for evaluating the organizing principle of a Protestant curriculum were the 1947 reports on "The Curriculum of Christian Education" and "Theological and Educational Foundations" as part of The Study of Christian Education made by a committee of the International Council of Religious Education, and the popular presentation of this material in book form, entitled The Church and Christian Education, edited by Paul H. Vieth. These criteria were validated in terms of comprehensiveness, internal consistency, comparison with alternate philosophies of the curriculum, relation to past experience, and anticipation of the consequences. The criteria were found to be valid when the principle of flexibility was made explicit.

In order to elicit the organizing principle that is operative in the literature of the Presbyterian "Faith and Life" curriculum, the interaction of content and experience was explored in terms of the place and treatment of these two components of the curriculum. Both quantitative and qualitative distinctions were drawn more sharply by comparing the Presbyterian series with a representative year of the old Presbyterian curriculum which the new supercedes, and with the corresponding year of the Methodist closely graded series.

The new Presbyterian curriculum for the children's division was found to be weighted on the side of content, though it provides for more experience than the old Presbyterian, but less than the Methodist. The Kindergarten materials of the new Presbyterian series accord with the criteria for this study: the spotlight of

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attention is turned on the individual learner's changing needs and experiences in vital relation to the great realities of Christian faith and life. The Primary and Junior departments follow the stated theory of the curriculum in placing at the center Jesus Christ, yet not so much the reality of the person of Christ as the life and teachings of Christ, with the purpose of helping the children know and follow Jesus' great example of love in action.

In developing the organizing principle for the first year in the children's division the Presbyterian "Faith and Life" curriculum has made the following significant contributions:

1. Provision is made for the home and the church to work together to give the pupil continuous and progressive Christian experience. No longer is the church school expected to do an impossible task in an hour or two a week. But the recommendation of this thesis is that the home should provide needs to serve as the starting point of lessons as well as follow-up at the end. If the pupils were encouraged to do more planning and take more initiative, the curriculum would be more flexible and would have more carrying power.

2. Christian revelation and education are viewed as complementary rather than as opposing processes. Evangelism, with emphasis on God's part in the transformation of life and nurture, with emphasis on man's responsibility, are interwoven in the curriculum.

3. Pupils are given freedom to develop their own convictions and to make decisions within a framework of Christian discipleship. The problem becomes that of freedom and authority rather than freedom versus authority.

4. The three great central themes afford unity and continuity of procedure. They are conducive to the teaching of basic, ongoing ideas rather than fragmentary topics.

THE THEOLOGY OF THE 1948-49 PRESBYTERIAN
"FAITH AND LIFE" CURRICULUM IN JUNIOR,
JUNIOR HIGH AND SENIOR DEPARTMENTS

(Publication No. 2773)*

Mary Evelyn LeBar, Ph. D.
New York University, 1951

Interest in the doctrinal content of church school material stems largely from the increasing influence of the neo-orthodox movement in theology. A cry has arisen from churchmen and laymen alike that the youth in the churches are not being taught the tenets of their faith, and that what is being taught them reveals a lamentable disparity between the preaching in the pulpit and the teaching in the church school.

As if in answer to these cries, the Presbyterian Church U.S.A. brought out in the fall of 1949 a new curriculum which was advertised as being strongly doctrinal. This study has investigated two theological areas of this curriculum to discover whether it is neo-orthodox in theology, and/or distinctively Presbyterian, or neither.

Criteria in the form of twenty-six questions were set up by which to measure the emphases and teaching of the neo-orthodox movement as agreed upon by writers both sympathetic and opposed to it. These criteria were applied to the new Presbyterian curriculum, the old Presbyterian curriculum and representative current Methodist material.

The Methodist doctrinal teaching clearly shows contrast with the emphases of neo-orthodoxy. The old Presbyterian series gives the impression that neo-orthodox thinking was beginning to be felt at the time these lessons were prepared in 1944-45. But the new curriculum shows a large proportionate increase in quantity of references that are emphases of neo-orthodoxy. The Senior department shows the strongest presentation of the distinctive and peculiar terminology and viewpoints of neo-orthodoxy, with the Junior High close behind it. The Junior department shows a theological inconsistency in the series: while the articles for parents and teachers present a uniform tendency toward neo-orthodox viewpoints, the materials in the lessons for the children are confusing, sometimes tending toward neo-orthodoxy and sometimes opposed to it. The general tone of the new curriculum reflects the spirit of

* Microfilm copy of complete manuscript of 268 pages, \$3.35. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-513.

neo-orthodox writings in their urgency and warmth, in their conviction that they have a vital message to communicate.

To discover exactly what doctrines and emphases were peculiar to Presbyterianism, the Westminster Confession, the Augsburg Confession and the Methodist Articles of Belief were collated. Twenty-two of the thirty-five chapters of the Presbyterian Confession agree with one or the other or both of the other creedal statements, indicating the large area of agreement resident even in these traditional statements of Protestantism. This study assumes that distinctive Presbyterianism is revealed in the unique features that sever it from other Protestant groups, that is, its points of controversy with them. The results when applied to the new curriculum show that it makes no attempt to teach or maintain the theological controversies of the past. It consistently omits the peculiar tenets of Calvinism, and does in fact stress opposing doctrines.

The new curriculum will therefore raise no barriers to keep Presbyterians feeling their difference from other Protestant groups; the chief differences will probably lie in approach and emphasis, or traditions, perhaps local rather than denominational. The issues of present-day theology in Protestantism would seem to revolve around adherence to the trend toward neo-orthodoxy, or its opposing liberalism, not around denominational differences.

**YOUTH PROGRAMS FOR AMERICA: CRITICAL ANALYSIS
OF FOUR PROGRAMS FOR MEETING THE NEEDS OF YOUTH
WITH SOME BASIC VALUES FOR ANY SUCCESSFUL PROGRAM**

(Publication No. 2833)*

Hal Graham Lewis, Ph. D.
Columbia University, 1951

This study analyzes our attempts to provide an educational program for youth who no longer are needed in productive jobs, and makes proposals for secondary education that will preserve some basic values.

Chapter I shows the extent of our industrialization and describes changes in the home and community during the last few decades. It shows the decline in employment of children and youth as our technology has developed and, by means of data on compulsory school laws and increases in secondary school enrollment,

* Microfilm copy of complete manuscript of 164 pages, \$2.05.
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that the American people have decided that youth shall spend in school those years formerly spent working.

Chapter II is concerned with how well the secondary school has met the demands made by the great number of new students. Obviously the traditional school planned for youth preparing for the established professions could not meet the needs of youth from all classes of society, from different economic and occupational backgrounds, and with a wide variety of vocational objectives.

Our success in expanding the school plant and training the rapidly increasing body of teachers is recognized. A broadened program of studies supplemented by many extra-class activities has increased the school's holding power. Vocational education has also been introduced and accepted as an important part of the secondary school.

In spite of these changes the record shows that the secondary school has not developed a program to meet the needs of all American youth. Approximately half who enter drop out before graduation unprepared for citizenship or for employment. Vocational education has been defined narrowly as specific job training and is used as an answer to the problem of the student with low academic ability.

Chapters III, IV, and V deal with other programs and proposals for providing youth with experiences which will equip them for an adult role. The programs of the Civilian Conservation Corps and the National Youth Administration, begun as relief agencies, were studied. The directors and others increasingly justified the existence of these agencies on the grounds of their educational effect on the youth enrolled. Their success in finding work projects and their insight into the benefits derived by youth from working are recognized but the proposal for making them a permanent part of our national program of education is rejected because of our democratic belief in a unitary school system for all youth.

The claims that compulsory military or other national service will bring educational benefits are set forth and analyzed. These proposals for national youth service are rejected on the grounds that they have an inadequate conception of the needs of youth and of the meaning of education in our democratic society.

The report of the President's Commission on Higher Education is considered and its proposals for community colleges and a widespread system of Federal scholarships are analyzed. The report is criticized for its implicit acceptance of a hierarchy of occupations with planning of the community college curriculum being done for the "higher" occupations.

The last chapter sets forth some basic values which any program of education for all American youth must take into consideration. It recommends that work be made a central part of the

secondary school program. It proposes that the schools should set up work projects of types not suited to private business and that work on these projects or jobs selected for their educational possibilities should be part of the secondary school experience of all youth. The chapter shows how the basic values which have been set forth are taken into account by this proposal. Some objections to the proposal are anticipated and met.

SPEECH EDUCATION IN BAPTIST THEOLOGICAL SEMINARIES IN THE UNITED STATES, 1819-1943

(Publication No. 2837)*

Charles Addis McGlon, Ph. D.
Columbia University, 1951

To discover what was done by a representative evangelical Protestant Christian denomination to prepare theological students for effective speaking and preaching, thirteen theological institutions sponsored by Baptists between 1819 and 1943 were selected for an historical study of speech education in the theological curriculum. The sources that were surveyed and analyzed included minutes of faculties and trustees, records of denominational agencies, religious periodicals and other publications, textbooks and lecture-notes, and biographical materials about the educators.

Objectives of the program of ministerial speech education were related to the personal and vocational needs of the student speaker, and to the education he should receive for his task of useful religious service and utterance. From 1819 to 1879 the major objective was to prepare the student to be a good preacher; from 1880 to 1943 it was to prepare him also to be a good minister.

To achieve the objectives, Baptists organized (1) independent seminaries and (2) literary and theological institutions. In each type the curriculum included Biblical Hebrew and Greek, theology, church history, and the composition and delivery of sermons and pastoral duties. Most speech instruction was offered in the latter area. Therein, departments were organized, professorships or titles designated, and courses were scheduled for the study of speech as a means of religious ministration.

Within the framework of educational organization, the faculties pursued the objectives through classroom instruction in speech, the

* Microfilm copy of complete manuscript of 484 pages, \$6.05.
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use of textbooks in secular and religious discourse, individual and group contributions to methodology, and extraclass activities. Though sometimes scattered throughout the curriculum and though taught mostly by lecturing, reading, and writing, speech instruction included considerations of speech principles, speech practice, and speech criticism in slight measure; the speaker, the speech, the audience or congregation, and the occasion; and thought, language, voice, and action. Although no method was used exclusively, the general procedures, in the order of their emphasis, were rhetorical, semantic, physiological, psychological, sociological, and eclectic.

Important developments seldom appeared with chronological significance, because of an unusual homogeneity of purpose, materials, and methods; but striking features of ministerial speech education were that the religious beliefs and educational theories of the denomination affected the theological curriculum and speech which was a part of it; that the program was consistently adjusted to the needs of the students; that the speech program was developed from a blending of general speech education and religious elements; that the speech program's greatest strength was its professional nature; that its most troublesome characteristic was the dichotomy (first recognized officially in 1879) between teaching fundamentals that would prepare the student to be a good speaker and teaching specialized subject matter that would make him a good preacher; that its most outstanding weakness was the meager provision for directed practice under critical supervision; and that, considered in terms of the educational theory and practice of their day, seminary faculties attempted to achieve the objectives in a commendably significant and comprehensive fashion.

Based on the findings of the study of the teaching of speech in Baptist seminaries in the United States between 1819 and 1943, the principal recommendations point to the need for specific training for teachers of all phases of religious discourse; for removing the dichotomies that exist between the foundational and professional elements of the speech curriculum, and between the classroom studies and the extra-class activities; and for developing ministerial speech education as a dynamic area of specialization in a framework of relationships.

CONCEPTS OF CHILD NATURE IN AMERICAN LIFE
AND EDUCATION, 1800-1900

(Publication No. 2893)*

Iris Culver Meadows, Ph. D.
University of Missouri, 1951

Elementary education has always been based upon certain assumptions, either stated or implied, concerning child nature. Even though such assumptions may not at times be openly defined, they are still present and reveal themselves in educational practices of a given period. It is in an attempt to give greater perspective to these changing assumptions that this study of the concepts of child nature during the nineteenth century has been made.

At the opening of the century the Puritan ideas about the nature of the child were still much in evidence. The Puritans believed the child to be an adult in miniature. They believed the child to be of an innately depraved nature, resulting from the original sin of Adam.

The practical consequences of these Puritan ideas were that the child was treated as an adult, with few allowances being made for his immaturity and inexperience. Also, he was disciplined in a harsh manner in order to suppress his evil nature.

Opposed to the supernatural views held by the Puritans were those of naturalism, arising mostly out of the scientific movement. The naturalists would refute the doctrines based on traditional authorities and would replace these with ideas and facts derived from observation and experimentation. They asserted that the human being was a part of nature. Many naturalists stated that since the child was fresh from the hands of the Creator, he was not evil but positively good because God could create nothing but good. The naturalists advised that a new concept of child nature be developed from empirical evidence, that the child should be educated by nature and according to nature. They pointed out that the child was not a miniature adult but that he developed gradually through successive and definable stages, although they still had no accurate knowledge as to what these stages were.

These new attitudes toward child nature resulted in attempts to describe the process of maturation; in the growing desire to learn more about the natural interests of children as an index both to understanding children and to educating them; in the desire to

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make education pleasant, regarding childhood as a unique and important stage of life; in the inclusion of nature studies as an important part of childhood education; and in a new emphasis on understanding as opposed to an earlier emphasis on memorization. The objective of the naturalists was not preparation for an uncertain future but the enrichment of life and the development of society.

The naturalistic movement culminated in the child study movement of the last two decades of the nineteenth century. The child study movement further advanced the attempts to add to the knowledge of child nature through objective study. The method of procedure was to attempt to arrive at facts through comparative analyses made of large numbers of children.

It is apparent that many of the doctrines regarding child nature which were accepted at the opening of the nineteenth century were still held by some at its close, just as today many of the doctrines of the nineteenth century still greatly influence educational practices.

One of the central ideas pointed up by this study is that our own concepts of child nature should be looked upon as largely tentative. Until psychology can probe much deeper into the study of child nature, it is best to follow the pragmatic or empirical approach in developing educational procedures.

AN ANALYSIS OF BADMINTON PLAYING ABILITY AND ITS RELATIONSHIP TO CONSTITUTIONAL BODY PATTERNS

(Publication No. 2778)*

Katharine Eleanor Moyna, Ed.D.
New York University, 1951

The purpose of this investigation is to determine and analyze the inter-relationships of constitutional body patterns with the basic elements, skill components and total performance in the game of badminton.

The basic elements are considered as the fundamental ingredients which underlie the skill components of badminton. The skill components are considered as the specific techniques which underlie the total performance in badminton. Total performance is the actual playing of a game of badminton.

The constitutional body patterns were determined by the

* Microfilm copy of complete manuscript of 157 pages, \$1.96. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-518.

somatotype technique. This is a standardized procedure in which the individual is photographed from three angles (front, back and side). An inspection of these photographs by a trained somototyper reveals the strengths of the three morphological components (endomorphism, mesomorphism and ectomorphism).

After the data had been collected on the forty-five college women students participating in this investigation, the following statistical techniques were imposed.

Zero order correlations were computed between the basic elements and total performance and the skill components and total performance. Inter-correlations were computed for the basic elements and skill components separately and together.

Multiple regression equations using the Doolittle method were computed for the basic elements and the skill components to determine the combination of elements and skills which yields the best correlation with the total performance criterion.

The standard error of the estimate was determined for the basic elements and the skill components, to discover the degree of accuracy and validity of predictions made from these equations.

A probability analysis was computed to determine the relationship between constitutional body patterns and the ability to play badminton. This analysis was computed for the three dominant morphological groups, and also for the morphological groups when the two strongest components were considered together. Interpretations of the P value are made on the five per cent level of probability.

Upon the basis of the evidence presented in this investigation, the following conclusions may be drawn:

1. That the composite score of the skill components has a greater relationship with the total performance criterion (ability to win games) than the composite score of the basic elements.
2. That ability in the basic elements cannot be used with valid results in predicting ability in the skill components as a high relationship does not exist between these two variables.
3. That the standard error of the estimate for the skill components (5.90) and the basic elements (7.40) are too large to allow for valid predictions on total performance in badminton. If predictions are made on the five per cent level of confidence, ninety-five out of one hundred times, the individual's total performance would fall within a range of ± 12 and 15 of the total performance estimates.
4. That the constitutional body patterns which are high in mesomorphism have better playing ability in badminton than those that are high in either ectomorphism or endomorphism.
5. That the skill components contribute more to the total performance criterion than do the basic elements. However, the most significant contribution is a combination of the basic elements and skill components.

**THE DEVELOPMENT OF A TENTATIVE VOCATIONAL
EDUCATION TRAINING PROGRAM FOR THE MOUNT VERNON
PUBLIC SCHOOLS BASED UPON A SURVEY
OF THE OCCUPATIONAL DISTRIBUTION OF RESIDENTS
OF THAT COMMUNITY**

(Publication No. 2779)*

Michael Francis Nealis, Ed. D.
New York University, 1951

The purpose of this investigation was to determine the effectiveness of the present vocational training program of the Board of Education, Mount Vernon, New York, in meeting the occupational needs of the community. Procedures included an analysis of the occupational distribution of the residents of that city. This analysis and appraisal served as a basis upon which recommendations for a program of vocational education offering curricula definitely designed to provide secondary school youth in the Mount Vernon school district with proper preparation for job opportunities available locally and in the Metropolitan New York area. Important procedures and results were as follows:

1. A definite numerical and job classification description of the employment distribution of the residents was determined through a study of the United States Census reports and other related authoritative statistical data.
2. Through the cooperation of community, state and Federal groups and agencies significant data were established concerning:
 - a. Occupational distribution of the workers
 - b. Annual turn-over of the workers
 - c. Opinions of employers, employer and employee groups about the amount and kinds of training needed by entering workers.
 - d. Possible opportunities for cooperative part-time work experience training.
 - e. Whether organized training is provided by local business and industrial firms.
3. A description of each of the occupations included in the employment distribution was prepared and the number of job opportunities regularly available was determined. These job descriptions listed the specific skills and operations required of beginning employees.

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4. The appraisal showed how curricula currently in use in the Mount Vernon public vocational education program were or were not correlated to job opportunities and job requirements both as they were set forth in accepted occupational titles and in prevailing industrial practices.

5. As a result of conferences with trades commissions inclusive of employers and employee representatives in the major trade areas, the current courses of study were evaluated.

6. Recommendations were made for curricula improvement as a result of a study of recently developed trade analysis for two and three-year sequences in the major occupational areas.

7. Based on the recommendations of the trades commissions and the vocational shop teachers, outlines of acceptable curricula were developed. These curricula represent the cooperative effort of trade teachers, representatives of industrial labor and management and the Advisory Board of Vocational Education in Mount Vernon. These modified courses represent a vocational training program which is in harmony with current trade practices and which provide realistic preparation for the types of employment in which the residents of the City of Mount Vernon are engaged.

8. The recommendations based on findings of the study promise to be helpful in establishing a vocational education program adequate to satisfy the needs of students for entrance into occupations and to provide better and more realistic preparation for participation in a vocation as properly adjusted citizens.

The vocational education program recommended for the city of Mount Vernon which grew out of this study constitutes an educational plan which is directed to satisfy the needs of students entering the world of work. The conclusions drawn from this study emphasize that a well organized program of vocational education, founded upon an occupational survey, has many educational outcomes. Among them are:

- a. Occupational adjustment
- b. Logical thinking
- c. The growth of initiative
- d. Closer teacher-pupil relationships
- e. A spirit of team-work
- f. A series of meaningful experiences

Each of these is a desirable objective for any educational program directed toward proper life adjustment and fruitful citizenship.

**A STUDY OF RELATIONSHIPS BETWEEN ACHIEVEMENT
OF STENOGRAPHERS AND TYPISTS ON THE NATIONAL
BUSINESS ENTRANCE TESTS AND THEIR PERFORMANCE
IN BEGINNING POSITIONS**

(Publication No. 2781)*

John Howard Nelson, Ph. D.
New York University, 1951

The problem of this investigation is to determine the relationships between achievement on the National Business Entrance Tests and the performance of stenographers and typists in beginning positions. Answers were sought for the following questions:

1. What constitutes the work of stenographers and typists in beginning positions?
2. How well do the employees perform the work connected with their positions as judged by their supervisors and personnel executives?
3. What is the relationship between achievement on the Stenographic Test and the Typewriting Test of the National Business Entrance Tests and the job performance ratings accorded the workers?
4. What is the reliability of the Stenographic Test and the Typewriting Test of the National Business Entrance Tests?

Four types of data were used: (1) Analyses of the work of stenographers and typists were compiled. These data were obtained from job analyses provided by the companies, and check lists of duties filled out by the workers. (2) The scores of the examinees which were checked by the central grading agency of the Joint Committee on Tests of UBEA and NOMA. (3) Measurements of job performance were obtained by means of a rating scale upon which personnel officers and supervisors accorded ratings for each employee. (4) Data on the reliability of the Typewriting Test were secured from 32 students on the college level by means of the test-retest method. Twenty-four high-school seniors provided the data necessary for the determination of the reliability of the Stenographic Test.

Through the cooperation of the Office Executives' Association of New York, Inc., the New York chapter of the National Office Management Association, seven companies were selected to participate in the investigation. Five of the seven companies provided

* Microfilm copy of complete manuscript of 182 pages, \$2.28. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-521.

personnel for the testing program. Forty-four stenographers and 37 typists were administered the Stenographic Test and the Typewriting Test respectively.

The results from the analysis of stenographic duties showed that all stenographers took dictation and transcribe notes, as would normally be expected. All of the stenographers used the telephone in connection with their work, and the majority also considered filing as part of their duties. The typing duties of the majority are: letters, memoranda, addressing envelopes, straight copy typing, simple tabulation, rough drafts, form letters, miscellaneous forms, and requisitions. The majority of the stenographers reported that a shorthand speed of 90 to 100 words a minute was needed for the satisfactory performance of work in their present positions. They also thought that a speed approximating 50 to 60 words a minute in typewriting would be needed for satisfactory performance of the typing duties connected with their positions.

The majority of 37 beginning, employed typists reported their typing duties as consisting of addressing envelopes, typing letters, memoranda, forms, straight copy, simple tabulation, and typing from rough drafts. Filing and use of the telephone represent non-typing duties reported by the majority of the workers. The majority group also indicated that a speed of 50 to 60 words a minute would be necessary for the satisfactory performance of their duties.

The relationship between job performance ratings of stenographers and their achievement on the Stenographic Test indicated a correlation coefficient of $r = .14 + .15$. The relationship as shown by the correlation is not significant since this may approximate zero. The reliability of the Stenographic Test indicated a correlation of $r = .70$. It is believed that the test is sufficiently reliable to support group comparison.

The relationship between job performance ratings accorded the typists and their achievements on the Typewriting Test indicated a correlation coefficient of $r = .11 + .16$. This correlation coefficient indicates an indifferent or negligible relationship between job performance ratings and achievement on the Typewriting Test. The reliability of the Typewriting Test is indicated by a correlation coefficient of $r = .78$. This degree of relationship between two administrations of the test to the same group is sufficiently reliable to support group comparison.

MEASUREMENT OF TRANSPORTATION NEED IN REORGANIZED SCHOOL DISTRICTS

(Publication No. 2740)*

Thomas Arthur Phillips, Ed.D.
University of Illinois, 1951

The Problem

The fiscal theory underlying the concept of a foundation program of public education is the equalization of all elements of cost essential to the provision of the program. Transporting pupils to and from school is an essential element in providing an equalized foundation program cost. The financial plan of school support in Illinois does not include an adequate allowance for transportation service. The purpose of this study is to determine a simple and objective method applicable to the community unit districts in Illinois for estimating a reasonable cost allowance for pupil transportation and to show how such an allowance for this service would improve the equalization of the foundation program currently in operation.

Method of Investigation Followed

The method can be described in three steps:

1. A criterion measure of transportation cost was obtained in 133 community unit districts by drawing bus routes in conformance with a list of defensible policies. The routes were drawn to the system of attendance centers indicated as "most desirable" by the superintendents of the districts. The basic data derived from the potential bus routes (miles per bus capacity) was converted to cost by reference to current bus mileage costs in Illinois.
2. A predictive measure was developed from readily obtainable and objective data by use of a regression equation.
3. Deficiencies in the present plan of financing transportation in Illinois were illustrated in nine school districts by comparing actual allowances for this service with amounts predicted by the measure developed in this study.

Findings

The formula for estimating foundation program transportation costs follows:

$$X_1 = 60.95 - 5.313X_2 + 0.048X_3 + 0.4(26 - X_4)$$

Where X_1 represents the estimated per capita cost of transporting pupils to and from school.

* Microfilm copy of complete manuscript of 74 pages, \$1.00. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-481.

X_2 represents the number of transportable pupils (those living 1 1/2 miles or more from school) per square mile.

X_3 represents the number of square miles per attendance center, counting all attendance in any one city or village as one.

X_4 represents the per cent of total road mileage in the district which is hard surfaced (concrete or "blacktop").

In the 133 districts studied, the transportation costs as estimated by the formula range from \$31.58 per transportable pupil to \$61.32. The median estimate was \$51.74 per transportable pupil.

In nine districts selected at random from different strata based upon assessed valuation per pupil, the costs as estimated by the formula exceed the current state support for transportation by amounts which range from \$17.88 per pupil in average daily attendance to \$26.97. These differences are now being met by the local districts.

The local tax rates necessary to meet these extra transportation costs and the foundation level of \$160 per pupil range from 43¢ per \$100 of assessed valuation to 67¢. The principle of equalization demands that the local contribution toward meeting these costs be derived from a uniform tax rate. In all but the three wealthiest districts, the transportation cost is now met by a local tax rate in excess of the uniform qualifying rate established by law, or the foundation level is lowered accordingly.

This study shows that the variation in cost of transportation among school districts due to factors beyond the control of school officials can be measured objectively, and the application of such methods for taking this service into account would more nearly equalize the financial support of the foundation program.

**THE TRI-FOLD APPROACH APPLIED TO ELEMENTARY
SCHOOL CURRICULUM: AN EXAMINATION OF MAJOR
CURRICULAR APPROACHES AND A PROPOSAL BASED ON
SOCIAL REALITIES, NEEDS, AND VALUES IN INTERACTION**

(Publication No. 2723)*

Vernon Loyal Replogle, Ed. D.
University of Illinois, 1951

The defined problem and scope of this study is the development of a valid approach to the elementary school social living curriculum.

* Microfilm copy of complete manuscript of 363 pages, \$4.64.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-464.

Through an examination of the literature it was determined that three distinct curriculum theories have had major impact upon the elementary school curriculum during the past twenty-five years. They were the child-centered, the social evolution, and the social functions curriculum approaches. The child-centered approach conceives a curriculum derived and developed from the needs and interests of children. The social evolution approach conceives a curriculum derived and developed from the universal institutions of advancing societies. The social functions approach conceives a curriculum derived and developed from selected areas of current social living.

Each curricular approach was reported on from the following points of view: Purpose and problem of the school; selection of content; organization; method of teaching; relationship to values, social realities, and needs; role of teaching; role of pupil; and evaluation.

An examination of recent writings disclosed that many contemporary educators were identifying themselves with one of three curricular schools of thought: social realities, needs, and values.

Based upon independent examination and studies of curriculum authorities, a tri-fold curriculum approach was set forth. In the light of evidence submitted in this study, a valid curriculum must be derived and developed from the interaction of three main curricular sources: social realities, needs, and values. The basis and importance of each interacting source was set forth through summarization of studies in sociology, psychology, philosophy, and related areas.

The three prevailing curriculum theories — child-centered, social evolution, and social functions — were critically examined from the point of view of the accepted tri-fold curricular approach.

The social evolution curriculum theory fails to give proper emphasis to freeing intelligence, reconstructing values, and understanding the meaning of democracy. Pupils have little opportunity to participate in democratic processes. Thus it does not meet the test of democratic values. It does not create an awareness and understanding of the urgent social problems of our time and, therefore, does not meet the test of social realities. It largely ignores pupil motivation and is little concerned with the needs of individuals. Thus it does not meet the test of needs.

The child-centered curricular approach has not been oriented, nor is it in accord with our currently validated democratic ideals. Thus it does not meet the test of democratic values. An assumed conflict between the individual and society has led to an undue neglect of society and an over-emphasis upon the individual. Little is done to develop sensitivities, understanding, and competencies to cope with current social problems and conditions. Thus it does not

meet the test of social realities. Though this approach emphasizes the importance of pupil purpose in the learning process, purpose and current interest are often confused. Nevertheless, to a large degree the test of needs is met.

Provisions for the clarification of values and the practice of democratic processes are not necessarily an integral part of the social functions approach. Thus it does not meet the test of values. The teaching of selected social activities are frequently so rigidly taught that the needs of children become lost in the process. Thus it does not meet the test of needs. That it is a curriculum taken from the stream of current life is its greatest merit and to a large degree it meets the test of social realities.

Selected teaching situations involving content dealt with in elementary schools were described for the purpose of illustrating how the tri-fold curricular approach may be applied.

THE SOURCES OF AUTHORITY FOR THE POWERS AND DUTIES OF THE ELEMENTARY SCHOOL PRINCIPAL IN MISSOURI

(Publication No. 2899)*

Leonard Theodore Rollins, Ed. D.
University of Missouri, 1951

Purpose

To determine as far as possible the sources of authority for the powers and duties of the elementary school principal in Missouri.

Method of Research

Data were obtained by information blanks returned by 377 superintendents of schools and 517 elementary school principals in Missouri school systems employing one or more elementary school principals.

Summary

For purposes of comparison, school systems employing only one elementary school principal were classified as Group I; school systems employing two or three elementary school principals, Group II; and school systems employing four or more elementary school principals, Group III.

1. Principals in Group II were employed in communities that were, on the average, very much larger than communities in Group I and very much smaller than communities in Group III.

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2. Principals in Group II were responsible for a larger number of employees, including classroom teachers, than principals in Group I and a smaller number than principals in Group III.

3. Principals in Group III were required to have considerably more hours of graduate training than principals in Groups I and II.

4. Principals in Groups I and II were more frequently required to hold a State Elementary Certificate than any other type. The State Elementary Principal's Certificate was more frequently required for principals in Group III.

5. Principals in each group were more frequently nominated by the superintendent of schools and approved or rejected by the board of education than by any other method.

The list of powers and duties of the elementary school principal compiled by the author of this study represents, to a remarkable degree, the work of the elementary school principal in Missouri. The powers and duties were considered under six major divisions, namely: administration, pupil personnel, secretarial and clerical work, supervision, public relations, and the amount of classroom teaching performed by the principal. Principals in all groups more frequently received the authority for their responsibilities concerning the first three divisions from the superintendent's written instructions; for the next two divisions by the initiative of the principal; and for the last division from the local school board regulations.

The relationship of the elementary school principal to the superintendent of schools concerning the functions considered in this study represent, to a remarkable degree, the relationship that exists between the principal and the superintendent in Missouri school systems in these areas. The 21 different functions considered were as follows: employee participation; employee personnel; training and retraining teachers in-service; finance; substitute teacher service; special problems of pupils; exceptional pupils; classification, promotion, progress, and guidance of pupils; pupil personnel records; textbooks; equipment and supplies; health and safety; co-curricular activities; courses of study; library service; public relations; research; the building program and building problems; transportation; office administration; and the opening and closing of school. The superintendent's written instructions were the most frequent source of authority for the relationship of the principal to the superintendent for each of the 21 functions in all three groups of principals, with the exception of research, employee participation, and co-curricular activities.

Conclusions

The fact that in this study the sources of authority for the powers and duties of the elementary school principal in Missouri and his relationship to his superintendent were more frequently the superintendent's written instructions, custom, or the initiative of the principal, than the written rules and regulations of the board of education seems to indicate that the board of education had not, to a degree that might be expected, carefully thought through the problems involved and provided for them in their comprehensive policy.

On the basis of continued research by the superintendent of schools and all other persons concerned, the superintendent should formulate proposed comprehensive policy or, when necessary, propose modification of present board policy concerning the powers and duties of the principal and his relationship to others for presentation to the board of education for its consideration and adoption.

EDUCATIONAL ACTIVITIES OF THE GARMENT UNIONS, 1890-1948: A STUDY IN WORKERS' EDUCATION IN THE INTERNATIONAL LADIES' GARMENT WORKERS' UNION AND THE AMALGAMATED CLOTHING WORKERS OF AMERICA IN NEW YORK CITY

(Publication No. 2858)*

Robert Joseph Schaefer, Ph. D.
Columbia University, 1951

Workers' Education in America is not easily defined. It has been interpreted as a means of equalizing educational opportunity, as a device for building loyalty to the union, and as an alarm for arousing workers to their potential power in effecting social change. Even when labor education has been frankly advocated as a means of consolidating labor power, there has been little agreement as to how this strength should be focused. Similarly, there is no unanimity on the means to be adopted in educating workers. Resident schools, after-hours classes in union offices, university extension programs, and weekend study institutes have all been advocated.

The great bulk of American unions have been indifferent to workers' education. A few unions, however, notably the International

* Microfilm copy of complete manuscript of 271 pages, \$3.39.
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Ladies' Garment Workers' Union and the Amalgamated Clothing Workers of America, have long been interested in its possibilities. This faith in education stems from many factors in the history of the Jewish labor movement, but chiefly from an early identification with socialism. Trade unions were conceived as weapons in the class struggle, incidentally useful for immediate economic gains, but primarily significant in hastening the cooperative commonwealth. To be effective members of such unions, workers had to be educated for their crucial role in the social change. Studying economics and history became as essential to labor action as picketing or attending business meetings.

Following World War I basic social reconstruction and even revolution seemed possible in America. Under the influence of a generally optimistic mood and the strong leadership of the clothing workers, labor education blossomed into a movement. Labor schools and labor colleges mushroomed into brief existence in many areas of the country, and the Workers' Education Bureau was established as the educational arm of the American Federation of Labor. For a few brief years men looked at workers' education as the new hope of the labor movement and as a promise for a better world. This vitality was dissipated in the disillusionment and materialism of the twenties, and, even in the garment unions, educational activities had to be curtailed. Severe economic conditions, communist dissension in the unions, and an increasing tendency to consider education peripheral to basic labor aims helped to explain the decline.

As their strength revived during the New Deal period, garment unions again sponsored workers' education. Education Departments trained candidates for minor union offices, initiated new members in the traditions and folklore of unionism, and helped to build loyalty to the unions by providing opportunities for recreational and cultural expression. They did not concentrate, however, upon the task of fitting workers to take a more responsible and directive share in controlling the economic order.

Union leaders discovered that who controlled government did matter to labor; they severed their old ties with socialism and joined the political alignment behind the New Deal. Labor educators also abandoned socialism, but they have not clarified this new involvement in American politics. Workers' education today has no clear outlet in political action.

**LEGAL PRINCIPLES UNDERLYING NEW JERSEY
EDUCATIONAL LAW INTERPRETATIONS AND APPLICATIONS
BY THE COURTS AND OTHER AUTHORIZED AGENCIES**

(Publication No. 2783)*

Francis Nicholas Silvestris, Ph. D.
New York University, 1951

The Problem

The problem of this study was to discover, annotate, identify, interpret, and validate legal principles underlying selected topics in educational law in New Jersey. These involved a study of statutes, constitutional provisions, the common law, and decisions of the courts of New Jersey and its authorized educational agencies, as well as Federal and other state courts.

The Purpose

The purpose of this study was to present the findings in a form which could serve teachers and other school personnel as a guide in finding answers to certain legal problems, and to advise them of certain of their legal rights and responsibilities. The study may provide the basis for a handbook of New Jersey school law for teachers and others.

Various interrelationships which exist between the New Jersey and United States governments through their constitutions, laws and courts, and among parents, pupils and teachers in the light of their constitutional, common law and statutory rights and privileges were dealt with in the study. In dealing with these, important statutes and important portions of court opinions were analyzed and are quoted.

Procedure

The procedure which was followed in conducting this study were the methods of legal research. An outline of possible topics in school law, which are of importance to the teacher, was first prepared. These topics were then studied in textbooks on school law, and in legal reference works and digests. A list of cases was prepared from these and from a study of the United States and New Jersey constitutions, and the statutes of New Jersey. This list was expanded through the use of a law citator. All the cases were then studied and their findings recorded upon cards. The data were then organized and developed in the various chapters of this study.

* Microfilm copy of complete manuscript of 259 pages, \$3.24.
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The Findings

The study of the numerous statutes, constitutional provisions, the common law, and the decisions of the courts yielded seventy-seven legal principles. The following criteria were used in establishing each of them as a legal principle: it was (1) found in the law, (2) recognized as a principle by the law, the courts, and officials of government, (3) expressed in the form of a rule, (4) of general application, and (5) sanctioned and recognized by authorities.

These principles were organized under chapter headings which dealt with the following topics: constitutional provisions affecting education; type of school organization in New Jersey; legal powers and duties of school boards; employment of teachers; dismissal of teachers; tort liability of school boards and teachers; rights and responsibilities of pupils and parents; sectarianism, and the exclusion of children.

Applications of the Study

This study is a supplement to statutes, constitutional provisions, the common law, and decisions affecting education. It draws upon all these as they are related to a particular problem in school law. The chapter contents and legal principles can serve as guides to teachers and others in answering problems, and in understanding rights and duties.

Recommendations

The study revealed certain situations which require correction by the Legislature. These deal with a denial of home rule, the extension of tort liability to school districts, a legal status for increments, and a restatement of policy in the matter of equivalent instruction elsewhere than at school.

AN EVALUATIVE FOLLOW-UP OF CLIENTS
OF THE UNIVERSITY OF MISSOURI COUNSELING BUREAU

(Publication No. 2905)*

J. W. Yates, Ed.D.
University of Missouri, 1951

Major Adviser: Paul C. Polmantier

Purpose

The general purposes of this study were: (1) To determine the progress of bona fide clients from the time counseling was initiated until the completion of the follow-up study for each client and (2) to relate the effect of counseling in relationship to the clients' progress. Specifically, the study consisted of obtaining the subjective evaluation of three competent judges concerning (1) the apparent progress of the individual clients, (2) the apparent benefit of counseling, (3) the apparent readiness of the clients for counseling, and (4) the apparent adequacy of counseling. The information from which the judges made their evaluations was obtained from the following four sources.

1. The case notes and tests in each client's folder.
2. An evaluation sheet filled out by each client.
3. A recorded follow-up interview with each client.
4. Pertinent information concerning a given individual client obtained from reliable sources when requested by the judges and when possible to obtain.

Method of Research

Thirty-eight former clients who cooperated willingly comprised the study group. The information obtained from these former clients along with the case notes of the individual clients were presented to the judges. Pertinent information concerning clients was also given to the judges when available.

Summary

Slightly less than one-half of the study group had made what might be termed satisfactory progress. Eighteen of the thirty-eight clients had made "some" or "good" progress in the opinion of the judges, while twenty had made "very little" or "no" progress. The counseling had been beneficial to fourteen of the thirty-one clients for which the judges had sufficient evidence to judge the

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beneficiality of counseling and of little benefit to the other seventeen clients. Twenty-eight of the thirty-eight clients, in the opinion of the judges, were ready to profit at least some from counseling. Counseling, in the opinion of the judges, had been adequate for twenty-one clients and not adequate for thirteen. For four of the clients the evidence was insufficient for the judges to determine the adequacy of counseling.

The agreement between judges was relatively good, but not so good as the agreement between individual judges and the final composite rating of the three judges.

The analysis of the judges' ratings showed significant positive relationships between progress and effect of counseling, between progress and adequacy of counseling, and between progress and client readiness for counseling.

The highest correlation was found between progress and effect of counseling. This correlation computed by the product moment formula was .82. The correlation between progress and adequacy of counseling computed by the same method was .51, and between progress and client readiness for counseling the correlation was .38.

Conclusions

It seems reasonable to conclude that (1) the clients, in general, felt that the services they received were helpful, (2) the clients felt the services should be extended to other students, (3) the clients were not making the progress which might have been expected of such a group, (4) the clients appeared to be ready to benefit more from counseling than they did, (5) the adequacy of counseling could have been improved, (6) there are significant positive relationships between progress and effect of counseling, between progress and adequacy of counseling and between progress and client readiness for counseling, and (7) a composite rating by three competent judges is superior to the individual ratings by the three judges.

In general, it would appear that the clients as a group were better satisfied with the services they received than were the judges.

EDUCATION AND PSYCHOLOGY

A STUDY OF THE EFFECT OF INTENSIVE SALES TRAINING EXPERIENCE UPON THE MEASURED ABILITIES AND PERSONALITY CHARACTERISTICS OF SALESMAN-CANDIDATES

(Publication No. 2757)*

Victor William Eimicke, Ph.D.
New York University, 1951

Purpose

The purpose in the investigation was to (1) study the effect of intensive sales training experience upon the measured abilities and personality characteristics of salesman-candidates and (2) determine if intensive sales training experience results in post-training measured abilities and personality characteristics which resemble the measured abilities and personality characteristics of successful salesmen more closely than the pre-training measured abilities and personality characteristics of salesman-candidates. Sales training experience is four hundred and fifty hours of controlled experience in salesmanship within the Sales Training Unit of the City College School of Business.

Procedure

Two experimental groups consisting of salesman-candidates were utilized in the study. The general adult male population and a group of successful salesmen were utilized as control groups. Two batteries of measuring instruments were utilized. Battery I consists of the Modified Alpha Examination, Form 9; the George Washington Social Intelligence Test; the Kuder Preference Record, Vocational; the Bernreuter Personality Inventory; and the Allport-Vernon Study of Values. Battery II is a standardized sales situation which was based on factors considered important for differentiating between skillful and unskillful salesmen.

The following steps were taken in the treatment of the data: (1) The measured abilities and personality characteristics of successful salesmen were compared with the measured abilities and personality characteristics of the general adult male population to determine if a typical pattern of abilities and personality characteristics exists for successful salesmen. (2) The measured abilities and personality characteristics of salesman-candidates, pre-training, were compared with the measured abilities and personality characteristics of the general adult male population to determine if

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a typical pattern of abilities and personality characteristics exists for salesman-candidates. (3) The measured abilities and personality characteristics of salesman-candidates, pre-training, were compared with the measured abilities and personality characteristics of successful salesmen. (4) The measured abilities and personality characteristics of salesman-candidates, post-training, were compared with the measured abilities and personality characteristics of successful salesmen. (5) The measured abilities and personality characteristics of salesman-candidates, post-training, were compared with the measured abilities and personality characteristics of salesman-candidates, pre-training, to determine if any changes took place during the intensive sales training experience. Comparisons were made in terms of central tendency and variability.

Conclusions

Among the conclusions that may be based on the results of this investigation are the following: (1) A typical pattern of abilities and personality characteristics exists for successful salesmen and for salesman-candidates who have had no experience in salesmanship. (2) Successful salesmen do not differ from salesman-candidates, pre-training, on the instruments in Battery I. (3) Salesman-candidates, pre-training, do less well than successful salesmen on the standard sales situation interview; but salesman-candidates, post-training, do better than successful salesmen on the standard sales situation interview. (4) Changes in the pattern of abilities and personality characteristics (as measured by Battery I) occur during the period of training, but these changes do not result in a post-training pattern of measured abilities and personality characteristics which is significantly different from the pattern of measured abilities and personality characteristics of successful salesmen. (5) The changes that take place during training tend to be in the direction of the pattern of measured abilities and personality characteristics of successful salesmen. In fact, the post-training pattern of abilities and personality characteristics of salesman-candidates tends to be an accentuation of the pattern of abilities and personality characteristics of successful salesmen.

Discussion

The discussion covers a review of the answer to the problem, applications of the findings, recommendations for educational procedures based on the findings, and suggested topics for further research.

AN EVALUATION OF CERTAIN PROCEDURES IN THE
SELECTION OF CAMP COUNSELORS BASED ON OBJECTIVE
TEST DATA AS PREDICTIVE OF PRACTICAL PERFORMANCE

(Publication No. 2761)*

Harry B. Gilbert, Ph. D.
New York University, 1951

This study represents an attempt to discover the extent of the relationship between certain characteristics of camp counselors and their performance on the job. It is essentially an application of personnel selection research to the area of camp counseling in which it has hitherto not been reported as employed.

The seven camps selected for the study represent a sampling of organizational camps in New York, New Jersey and Pennsylvania, all with headquarters in New York City. The camps are for boys and are all supported by private philanthropy and, in some instances, by moderate fees for campers. The camp season extends through July and August although the individual camper's vacations vary from two weeks for most, to the entire summer for a fortunate few.

In June and early July 1947, each camp was visited and each of the counselors, with the exception of head counselors and key specialists, was given the following battery of tests: The Wesman Personnel Classification Test, Form A, The Bennett Mechanical Comprehension Test, Form AA and The Minnesota Personality Scale for Men. In addition a brief experimental edition of a specially devised Counselor Mental Hygiene Test was administered as well as a "Counselor Background Data" questionnaire. The latter form provided such information as age, years of schooling, previous counselor experience and salary. The total number of counselors studied was 153.

Two measures of performance were obtained to serve as criteria of success. One was a ten point rating of each counselor by the camp directors. The other was an application of the nominating technique whereby the counselors themselves selected the best and worst of their colleagues.

Two approaches were employed to study the validity of the predictive data, the correlational and comparison of means of best and worst counselors. In general the correlational approach revealed that the Wesman and Minnesota tests were not related

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significantly greater than zero with either criterion of success. The Bennett test was not related significantly greater than zero with the criterion of counselor nominations but the correlation with director rating was .199, significant at the five per cent level. Low positive relationships were found between age, years of schooling, previous counselor experience and the criteria of success. A multiple R of .399 was obtained between salary, age, previous counselor experience, Counselor Mental Hygiene Test, Part IV of the Minnesota Personality Scale and the criterion of director rating.

Comparison of means of best and worst counselors revealed significant differences in intelligence and mechanical comprehension scores, age and years of schooling. The multiple cutoff procedure was employed whereby the following critical scores for elimination purposes were demonstrated hypothetically to be useful in improving retained counselors, according to the criteria of success: Wesman Personnel Classification Test score below 28, Bennett Mechanical Comprehension Test score below 31, Age below 18 and Years of School below 12.

Certain limitations of the research preclude adoption of the proposed critical score technique without further study. The most important limitation is that inter-camp variability is significantly higher than intra-camp variability. Pooling the data rests on the assumption that differences tend to cancel one another. This assumption should be verified by continued study within individual camps. Another limitation lies in the possible differences between test scores which may be obtained by applicants, where other emotional factors enter, and those obtained in this study by counselors already employed.

Further research was recommended along extension of the present study to private camps and camps for girls. The experimental Counselor Mental Hygiene Test appeared promising and further development was proposed.

A bibliography and appendix containing tests and forms used is included.

THE RELATIONSHIP OF CERTAIN MEASURABLE FACTORS
IN THE PERSONAL AND EDUCATIONAL BACKGROUNDS
OF URBAN PUBLIC SCHOOL TEACHERS TO THEIR
PARTICIPATION IN COMMUNITY IMPROVEMENT ACTIVITIES

(Publication No. 2765)*

Andrew Wing Sing In, Ph.D.
New York University, 1951

Statement of the Problem

What are some of the characteristics of teachers who participate in community improvement activities? Of teachers who do not? What characteristics contribute to active participation? How can the teacher's citizenship role be improved? What do teachers give as reasons for their participation in community improvement? How do teachers make their contributions? These are some of the questions considered in this study.

The problem is stated in the hypothesis that teachers who actively engage in community improvement activities differ significantly in age, sex, marital status, religion, residence, years of teaching experience, years of service in the school system, years of educational training, level of service in the school system, and participation in extra-curricular activities while in college from teachers who engage in community improvement activities seldom or not at all.

Procedures Used in the Study

Four school systems were selected to participate in this study. These communities had between 35,000 and 45,000 population; a substantial local social life balancing business and industrial activities; no singularly unique characteristic; and school policies which do not discourage teacher participation in the activities of the community.

Two groups of teachers were selected in each of the cooperating communities to test the basic hypothesis of the study. A questionnaire inventory was used to measure the nature and extent of teacher participation in community improvement activities. Teachers classified as active and seldom active or inactive participants were compared with respect to each of the factors. Relationships were determined through the use of tests of independence and tests of the significance of the difference of the means.

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The findings of relationships in each community were then compared to determine whether they were the same for the two groups of teachers in comparable communities.

Summary of Findings and Conclusions

The types of activities in which teachers participate vary little among the four communities. Teachers tend to concentrate their participation in activities for improving community health, social welfare and recreational conditions. Kinds of participation within activities also do not seem to differ from community to community. Teachers voice both personal factors and reasons of a community nature as affecting their participation.

The factors of age, marital status, religion, years of teaching experience, and years in the school system cannot be considered as having any causal relationship to teacher participation since no significant difference is found between the two groups of teachers in all four communities. The factors of sex and years of educational training seem likely to have no causal relationship to teacher participation since the findings of no significant difference are in agreement in three of the four communities. Residence is the only factor of significant difference in all communities and seems to be of some causal relationship to teacher participation. On the basis of similar findings of significant difference in three of the four communities, the factor of participation in extra-curricular activities is likely to be of some relationship to teacher participation. Judgment is withheld regarding whether the factor level of service can or cannot be considered a contributing causal factor because of the lack of agreement in the findings of relationships among communities.

Implications

The findings of this study seem to imply that teachers tend to participate more frequently in those activities for community improvement which have a close relationship to their professional interests. There is also an implication that teachers tend to participate less frequently in activities of a controversial nature. Another implication from the findings is that teachers living in the community are more likely to take part in activities of the community. Finally, the findings imply that teacher participation in community improvement activities is affected by many reasons or factors other than those investigated in this study.

Recommendations

Recommendations are here offered for consideration by those interested in improving the citizenship role of teachers in the four cooperating communities and in comparable communities.

Teacher groups should evaluate their individual and group

contributions. Cooperative planning through teachers associations should be helpful in providing teacher participation in activities lacking teacher representation, and in avoiding a concentration of teacher efforts and contributions within a narrow scope of community problems.

School boards should make it a school policy to encourage teacher participation. They should invite teacher training educators to work with school administrators and teachers to develop skills and techniques for bettering school-community relations. It is further recommended that they help teachers develop ties and interests in the community; they make salaries adequate to remove the need for teachers to hold additional jobs to supplement incomes; and they make it possible for teachers to attend meetings of community civic and service organizations held during school hours.

Community groups should invite teachers to membership and to help plan and organize activities. Teachers should not be exploited to carry out activities planned and organized solely by community groups. Activities which require teacher cooperation for successful completion should have teacher participation in planning and organization.

Finally, teacher training educators should utilize community resources more fully to provide experience in non-school related community activities for students preparing to be teachers.

EFFECT OF VOCATIONAL COUNSELING ON SELF-KNOWLEDGE

(Publication No. 2825)*

Davis Gilman Johnson, Ph. D.
Columbia University, 1951

Problem

The purpose of this study was to determine what effect vocational counseling has on self-knowledge. Specific hypotheses were (a) vocational counseling significantly increases accuracy of self-knowledge, (b) it significantly increases certainty of self-knowledge, (c) there is a significant positive relationship between accuracy and certainty, and (d) there is a significant relationship between self-knowledge and other factors such as client and counseling characteristics.

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Procedure

The sample consisted of one hundred white, male voluntary guidance center clients who had never before received vocational counseling.

Subjects filled out self-rating questionnaires immediately before, immediately after, and one month after counseling on which they indicated (a) what fifth of the population they rated in as regards intelligence, interests, and personality, and (b) how certain they were (not sure, fairly sure, very sure) they had rated themselves in the proper fifth.

Counselors assigned the Otis, Kuder, and Bernreuter tests to all subjects and after counseling provided the criterion by rating the "true" characteristics of their subjects on a five-point scale similar to that used by the client.

The data was analyzed by computing means, standard deviations, and correlation coefficients for all variables and checking the correlations and the differences between means for significance. Supplementary analysis also included (a) Chi-Square checks on the significance of differences and (b) a comparison of findings for the subjects of different counselors.

Findings and Conclusions

1. The average subject of age 24.5, education 12.7 years, and I.Q. 115 was reasonably representative of other clients at this center and moderately representative of clients at other counseling services.

2. The typical client saw his counselor for about 4 hours, took 10 or 11 tests, and consumed approximately 34 days from the start to end of counseling.

3. Intelligence test results were typically presented as percentiles, interest scores as profiles, and personality results as quintiles or less exact categories.

4. Vocational counseling significantly increased accuracy of self-knowledge, by .44 points (on the 5-point scale) for intelligence, .23 points for interests, and .08 points for personality. This confirms the need for and value of testing and counseling.

5. Vocational counseling significantly increased certainty of self-knowledge, by .50 points (on the 3-point scale) for intelligence, .30 points for interests, and .22 points for personality. This implies one of the main values in counseling may be the added confidence it gives.

6. The increase in self-knowledge through counseling was maintained to a high degree during the follow-up period. This offers encouragement that individual counseling is an effective form of learning situation.

7. Before counseling, there was a significant positive relationship between accuracy and certainty for self-knowledge of intelligence (.23). After counseling, there were significant relationships for both intelligence (.29) and interests (.25) but the relationship for personality, though positive, was not statistically significant (.11). These low correlations between accuracy and certainty suggest a need for caution in predicting one from the other.

8. The relationship between self-knowledge and other factors was in general very low with a tendency for positive relationships with intelligence, education, and emotional stability, negative relationships with number of tests taken, and a lack of relationship with age, veteran status, and amount of counseling received. These low correlations with client characteristics imply the need for counseling individuals of all backgrounds; while the negative relationship with number of tests taken implies the need for clarifying contradictions in test results and helping clients distinguish between such matters as abilities and interests.

9. The greatest gains in self-knowledge were found for intelligence, next for interests, and least for personality. This implies that counseling may increase self-knowledge of relatively objective factors more than subjective ones. It also indicates the probable effect of different test interpretation techniques on self-knowledge.

A COMPARATIVE INVESTIGATION OF THE RESPONSES TO FRUSTRATION OF NORMAL-HEARING AND HYPACOUSIC CHILDREN

(Publication No. 2766)*

Harris Kahn, Ph.D.
New York University, 1951

In the determination of the relation between hearing loss and response to frustration three groups of children, equated with each other in terms of age, sex, school grade, approximate socio-economic status and intelligence, were studied and compared through the use of one projective and one "realistic" test of response to frustration. The three groups were composed of normal-hearing, moderately hypacousic and severely hypacousic children, respectively.

It was found that all of the groups were comparatively low in the number of conventional responses to frustration. The

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hypacousic children, especially the severely handicapped, tended to respond to frustration in a manner designed to reduce or eliminate the causes of frustration and to respond to frustration appropriately in terms of the extent of their responsibility for the frustration-inducing circumstances. In general, the indication was that although there were few differences between normal-hearing and hard-of-hearing children in response to frustration, the few differences suggested quite strongly that, for the children studied, hearing loss did not result in retarded emotional or social maturity or undesirable personality characteristics; the hard-of-hearing children gave evidence of being better able to meet and cope with frustration than were the non-handicapped children.

By means of correlational techniques it was found also that the two frustration techniques employed had a high degree of commonality; that is, that the techniques provided means for the assessment of the same aspects of behavior. Because of inherent differences in the techniques, the "realistic" test of response to frustration was more valuable for discriminating between the groups.

THE RELATION OF ACHIEVEMENT IN MATHEMATICS TO CERTAIN ABILITIES IN PROBLEM-SOLVING

(Publication No. 2774)*

Theodore Arceola Love, Ph. D.
New York University, 1951

Statement of the Problem

This study was made in order to determine the relation of achievement in mathematics to three specific problem-solving abilities, namely: (1) the ability to select data essential to solving problems, (2) the ability to perceive and use relationships among data needed in solving problems, and (3) the ability to apply generalizations.

The study was a statistical evaluation and interpretation of the relation of achievement in secondary school mathematics to the three specific problem-solving abilities. Problem-solving ability was conceived as being the conscious response to, and attack upon, problem situations arising in all aspects of human relation.

Method and Procedure

A stratified-random sample of 300 beginning college freshmen who were enrolled in a state-supported college, as of September,

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1950 and who graduated from high schools located within that state during the Spring of 1950 was used in making this study. Instruments used for obtaining quantitative measures with respect to certain significant characteristics of these freshmen included (1) personal data sheets, (2) official transcripts, (3) official publications of the Alabama State Department of Education, (4) Sims Score Card for Socio-Economic Status, (5) American Council on Education Psychological Examination, (1948 Edition), and (6) the Nelson-Denny Reading Test.

Selected published tests were used to obtain measures of achievement in mathematics, and the specific abilities in problem-solving. Two different tests were used to obtain measures of two different types of achievement in mathematics, namely: (1) computational facility, and (2) functional thinking in mathematics. Two different tests were used to obtain measures of two different aspects of the ability to select data essential to solving problems, namely: (1) the ability to extract from charts, graphs, tables, and maps, specific items of data which are indispensable in arriving at a solution to a specific problem, and (2) the ability to extract from verbal statements specific items of data which are indispensable in arriving at a solution to a specific problem.

Summary and Conclusions

The average age of the members of the sample and of the population from which the sample was drawn was 18.5 years. They were identified as belonging to the middle socio-economic status group. On the average, they had taken 4.5 units of mathematics in grades 7 - 12. Their average reading ability was about ninth grade level; and they also exhibited low general intelligence.

The achievement in mathematics and the evidenced specific problem-solving abilities were, in general, comparable to the exhibited general intelligence of this population of beginning college freshmen. The results of this study revealed a low, yet statistically reliable, positive, linear relationship between achievement in functional thinking in mathematics and the specific problem-solving abilities; and, a low, positive, linear, but not statistically reliable relationship between achievement in computational facility in mathematics and the specific problem-solving abilities.

The following conclusions were based upon (1) the statistical evidence revealed by the measures obtained with respect to the variables compared, and (2) the sample of beginning college freshmen who were graduated from Negro high schools located in Alabama during the Spring of 1950:

1. Beginning college freshmen of varying degrees of general intelligence exhibit equal or practically equal levels of achievement in computational facility in mathematics.

2. Beginning college freshmen exhibit competence in the selected (specific) problem-solving abilities comparable to their general intelligence.

3. The relation between achievement in functional thinking in mathematics and the specific abilities in problem-solving (though too low to be considered substantial) is higher than the relation between computational facility in mathematics and these abilities.

4. The relation between general intelligence and these specific abilities in problem-solving is, in general, much higher than the relation between achievement in mathematics and these abilities.

5. The relation between achievement in mathematics and these specific abilities in problem-solving is, practically, negligible.

EVALUATION OF THE PERSONALITY ADJUSTMENT OF A GROUP OF PHYSICALLY HANDICAPPED CHILDREN WHO RECEIVED OCCUPATIONAL THERAPY

(Publication No. 2775)*

Anita Frances Lyons, Ph.D.
New York University, 1951

The aim of the study was to evaluate the personality adjustment of physically handicapped children before and after the administration of occupational therapy.

Thirty physically handicapped children ranging in age between eight years, ten months and fourteen years and attending a special school were selected for the study. All had their physical handicaps one year or longer and had intelligence ratings of low average or above.

A psychological battery consisting of the Haggerty-Olson-Wickman Behavior Rating Schedules, the Rogers Test of Personality Adjustment, the Rosenzweig Picture-Frustration Test for Children, and the Rorschach Test was administered to the children. The first battery was administered at the beginning of the study. Until the end of the term the children followed their usual school routines. At the close of the first semester the children were re-rated by their teachers with the Rating Schedules. The second battery was administered at the beginning of the second school semester. Following this, and for the remainder of the second term, the children attended occupational therapy classes

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twice a week as part of their school routine. At the close of the second term the third psychological battery was administered.

The occupational therapy was prescribed by the school physician and had functional, social or recreational aims. Daily progress records were kept. The data were treated statistically and qualitatively. The statistical analysis revealed that there were no significant differences at the one per cent level (using the test for "t") before or after the administration of the occupational therapy.

The statistical results of the subjects were compared also with the various norms. The Rating Schedules results revealed more than the average number of behavior problem tendencies before and after therapy. More than average maladjustment in the area of Social Inferiority of the Rogers Test were found before the therapy. After occupational therapy, tests revealed more than average maladjustment in Personal Inferiority and greater than average general emotionality, irritability, sensitivity and impulsiveness.

Qualitative treatment of the data included the compilation of individual case studies and the analysis of small group tendencies.

The following conclusions were reached:

1. The assumption that the personality adjustment of physically handicapped children and normal children may differ was upheld. There was evidence of more behavior difficulty and more than average emotionality and sensitivity in the subjects than in non-handicapped children. Teachers' ratings consistently indicated the subjects were more maladjusted than physically normal children.

2. No statistically significant differences at the one per cent level were found to support the hypothesis that occupational therapy influenced the personality adjustment of physically handicapped children. Qualitative analysis of the psychological data, however, revealed occupational therapy influenced by personality adjustment of certain of the subjects. These results showed that functional therapy led to more improvement in personality adjustment of physically handicapped children than social or recreational occupational therapy. The most severely handicapped children, those whose handicaps were of the longest duration, and those who made the most satisfactory progress during occupational therapy, made the most progress in personality adjustment after the administration of occupational therapy.

3. The techniques employed did not detect the effect of occupational therapy on personality adjustment. This may have been due to the coarseness of the measurements and/or the methodology.

The results of this study suggest the need for further research in the field. Other studies should be completed which vary the psychological approach, the duration of the occupational therapy, and the age levels of the subjects.

**FACTORS IN THE SCHOLASTIC ACHIEVEMENT OF COLLEGE
STUDENTS WHO WERE GROSS UNDER-ACHIEVERS
IN HIGH SCHOOL**

(Publication No. 2895)*

Arthur William Mullens, Ed. D.
University of Missouri, 1951

Major Adviser: Paul C. Polmantier

Purpose

To learn more about the college success of a group of Missouri high school graduates whose aptitude for college, as measured by the Ohio State University Psychological Test, enables them to rank in the upper fifty per cent of all Missouri high school seniors but whose high school scholarship ranks them in the lower fifty per cent of their group.

Method of Procedure

The Office of Admissions supplied official listings of the 1948-49 freshman classes and official high school transcripts. The files of the Missouri College Aptitude Testing Program were searched to locate those students whose records included the Ohio Test score and the high school scholarship percentile rank. Students were then classified by quintiles according to their performance. One hundred two students whose performance deviated two quintiles from the Ohio Test prediction were selected for the investigation. Personnel files in the offices of the Deans of the colleges in which these students were enrolled were searched for information concerning employment, loans, referrals to the University Counseling Bureau, deficiency reports, disciplinary action, visits to the Student Infirmary, and Mental Hygiene Clinic. Records at the University Counseling Bureau were searched for data pertaining to performance on the American Council on Education Psychological Examination, the Cooperative English Test, and also for information recorded during counseling periods. The total group was divided into two sections: (1) those no longer enrolled; and (2) those currently attending the University. Personal interviews were conducted with those at the University. High school teachers provided information about those no longer enrolled.

Summary

1. High school scholarship was the one most reliable criterion by which to judge success in college.

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2. The majority came from large centers of population.
3. Graduates of small high schools achieved a higher college grade point average than those graduating from large schools.
4. Of those interviewed, the majority stated that they did not study, weren't interested in school, and were generally inattentive.
5. These under-achievers did not come from homes in which financial difficulties created a hardship.
6. Parental occupation was described by the majority as either managerial or professional.
7. University student personnel services were not utilized by the majority.
8. Decision to come to college was not the result of the student's own planning but was influenced by others.
9. Success in college did not improve with continued attendance.
10. Problems of health or finance did not affect college scholastic performance.
11. Grade point average for the group no longer enrolled was 1.33; those currently enrolled achieved a grade point average of 1.97.
12. Complete case studies of 102 under-achievers are presented in the original study.

Recommendations

On the basis of data obtained, it is recommended that:

1. More schools participate in the Missouri College Aptitude Testing Program.
2. More emphasis be placed upon the student personnel services available at the University.
3. Greater use be made of available test results by high school and college instructors in order to ascertain the potentialities of their students.
4. A longitudinal study be made of the problem of under-achievement. It has been shown that the problem of under-achievement does not originate after these students come to college.
5. Guidance and counseling services throughout the entire school system be expanded in order to facilitate the conservation of human resources.

SOCIAL ATTITUDES OF FRESHMEN IN MICHIGAN COLLEGES

(Publication No. 2849)*

Harrison Sumner Pfeiffer, Ph. D.
Columbia University, 1951

The Nature of the Problem

This study seeks to determine the attitudes of college freshmen about many controversial public issues and questions of personal

behavior, and the relation of these attitudes to various factors in their socio-economic backgrounds.

Methods of Procedure

The data for the study were obtained through a questionnaire, which consisted of a social inquiry blank and a series of attitude tests. This questionnaire was administered in the fall of 1936 to 1882 freshmen upon their entrance to eight Michigan colleges. The colleges were representative state teachers colleges, denominational colleges, and junior colleges, widely distributed throughout Michigan.

For each item in the tests, percentages of approval and disapproval were calculated, in order that a comparison of the items on a basis of their general acceptance might be expressed in terms of the differences in these percentages of approval or disapproval. Each questionnaire also was given a liberalism score, as determined from a rating of the liberalism of each item by a jury of experts, and an intensity score, based on a student's rating of the intensity of his attitude on each test item. When it was desired to compare the liberalism or intensity of opinion of groups of students who were classified according to some common trait, mean liberalism or mean intensity scores were computed as measures of central tendency. The reliability of the difference in these mean liberalism or intensity scores was determined either by calculating the difference divided by the standard error of the difference or by employing Fisher's analysis of variance.

Some Findings of the Study

1. An analysis of student reactions to the tests indicated that the subjects of this investigation were more likely to be conservative than liberal in their opinions. In general, they supported the community mores, and believed that they were more likely to approve acts of personal behavior than were their best friends, their parents, their teachers, or their communities.

2. Forms of amusement which received their support and, according to their statements, that of their friends, parents, teachers, and communities included dancing, attending "movies," playing bridge, and attending and participating in Sunday baseball games. Unacceptable to them and to other community groups were smoking in public by women, "dating" of pupils by their instructors, equal social and political privileges for the colored race, and equality of privilege for Socialists and Communists with other political parties.

* Microfilm copy of complete manuscript of 251 pages, \$3.14. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-586.

3. In comparison with teachers, students showed more optimism for the future, were more capitalistic, were more opposed to aliens and Jews, and more generally supported drastic punishment for the criminal and compulsory military training. Their reactions, however, frequently resulted in qualified and conflicting opinions, and when compromising proposals were presented, they tended to take "middle of the road" positions.

4. Significant differences were found in the liberalism scores of students, when grouped according to age, sex, and economic status of the family. No significant differences were shown, however, between the liberalism scores and the educational plans of students, their extent of travel, or the schooling of their parents.

5. When divided according to political party preference, the rank order of groups from the highest to the lowest in both mean liberalism and mean intensity scores was (1) Socialist, (2) Democrat, (3) Republican.

6. Students who indicated no church preference were both more liberal and more intense in their opinions than were the Protestant and Catholic groups.

7. The general order from conservatism to liberalism of opinions on public questions for students attending different types of educational institutions was (1) sectarian college, (2) junior college, (3) teachers college.

8. Significant differences in the intensity scores of students suggested that the liberal is more likely to be intense in his opinion than the conservative, but that the latter is more intense than he who is guided by a social philosophy of neither conservatism nor liberalism.

PERSONALITY DIFFERENCES BETWEEN UNDER- AND OVER-ACHIEVERS IN COLLEGE

(Publication No. 2857)*

Francis Joseph Ryan, Ph. D.
Columbia University, 1951

Personality factors associated with deviation from predicted grades at Yale College were investigated by means of the Group Rorschach Test, the Strong Vocational Interest Blank and a short questionnaire eliciting information concerning family situation. Comparisons were made by means of the chi-square technique

* Microfilm copy of complete manuscript of 62 pages, \$1.00. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-594.

among three groups of subjects (designated as under-, normal- and over-achievers) who were equated for general predicted score but who differed in academic performance. Predicted score is the dependent variable in a multiple regression equation of which the three independent variables are (1) adjusted secondary school record, (2) Scholastic Aptitude Test score, and (3) the total of three College Entrance Board Examinations.

It was hypothesized that deviation from general predicted score is positively related to super-ego status, i. e. the degree to which certain moral and social values are accepted.

Comparisons among the groups for Rorschach responses were made by the use of Davidson's "sign" approach. The groups were not separated by total adjustment score. However, the over-achiever group showed a significantly greater frequency of popular responses, animal responses and excess of animal movement over human movement. These findings were interpreted as being in harmony with the hypothesis.

The occupational scales of the Strong Vocational Interest Blank distinguished among the groups with more than chance expectancy. The under-achievers scored significantly lower than the other groups on the minister scale and significantly higher on the masculinity-femininity scale. These results were viewed as adding some support to the hypothesis, but it was concluded that the Strong is not an entirely adequate instrument for the investigation of discrepancies in college achievement.

The questionnaire results showed that parents' marital status and mother's occupational status have a significant and linear relationship to scholarship. Both divorce and occupational activity other than housewife on the part of the mother are independently associated with under-achievement. These findings were interpreted as support for the hypothesis that there exists a relationship between positive deviation from general predicted score and super-ego strength.

**A FOLLOW-UP OF CERTAIN COLLEGE TRANSFER STUDENTS
WHO WERE SCHOLASTICALLY DEFICIENT ON ADMISSION
TO THE UNIVERSITY OF MISSOURI**

(Publication No. 2902)*

George Keith Shoemaker, Ed.D.
University of Missouri, 1951

Major Adviser: Paul C. Polmantier

Purpose

It was the purpose of this investigation to indicate factors concomitant with the scholastic success of University of Missouri students whose achievements in previous colleges or universities had been low.

Method of Research

A follow-up of 133 scholastically deficient transfer students admitted to the University during a period of fourteen months was made to determine factors accompanying success in the University. These factors were determined by securing information from forty of these students utilizing the following sources: test data; student statements elicited during an interview; the counselor's evaluations; personal data sheets completed by the students; and responses to questionnaires.

Summary

These 133 students earned grade point averages in the University above those made in previous colleges but slightly less than a group of entering University freshmen. Forty-four of these were successful in establishing and maintaining a grade point average of at least an "M." However, in succeeding semesters, those students who continued in the University tended to regress toward the previous level of below-average academic achievements.

The main factors reported by the forty students interviewed as being causal factors of previous low college achievement were: poor study conditions or habits, living at home, lack of motivation, too much social life, and outside work interfering with scholastic activities. The remediation of these causal factors together with the students' increased maturity and changed vocational and educational objectives were reported by the successful students as resulting in their improved academic status. Except for living at

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home, the continuation of the above factors at the University was reported by students with continued low achievements as causing their poor scholastic success.

Evidence indicated that such students have great need for personnel and remedial services. A relatively small percentage of these students made use of either the services of the Reading and Study Clinic or the University Counseling Bureau.

Conclusions

On the basis of evidence presented, it seems reasonable to conclude:

1. That because of the overlapping in the admissions test scores among the various achievement groups studied, the use of specific minimum or cutting scores is not warranted in the selection of these students. Raising the standards of admission in terms of higher test scores would eliminate a number of potentially successful students.

2. That concomitant with transfer to the University of Missouri were factors operative in the lives of the 133 students motivating them to earn higher grade point averages in the University than those earned in previous colleges. A number of these factors can be identified. It appears that other factors, which also act as motivating forces, are not readily identifiable. However, in spite of their apparent increased academic success, unless these factors are even further intensified or others are brought to bear, most such students are not likely to measure up to the minimum standards for graduation from the University.

3. That advisers and counselors working with these students may stimulate them toward academic success by helping such students to secure instruction in improving reading and study skills; to secure a clearer picture of possible educational and vocational goals; to understand better the need for balance between academic and social life; and to maintain balance between outside work and academic work loads.

It would appear that these students are in need of the use of the remedial and personnel facilities of the University. A program of special advisement, counseling, and referral to appropriate remedial services would seem to be advisable procedures for such students. Since facilities are currently available on campus, it is recommended that such a program be devised and put into effect. Until a plan can be made available to all such students, only those students making relatively high scores on the test battery seem likely to be the best prospects to profit from such a program. A follow-up to determine the effectiveness of a program, if adopted, is also recommended.

UTILIZATION OF THE PRINCIPLE OF EXTIRPATION
IN THE HARVESTING OF SUGAR BEETS

(Publication No. 2710)*

Stephanus Johannes Paulus Kruger van Heerden, Ph.D.
Michigan State College, 1951

The problem of providing better machinery for sugar beet production has been recognized as meritorious since the early stages of the development of the sugar beet industry in the U. S. A. and in Europe. Progress, however, was almost stagnant during the period prior to 1930, and commercialization of sugar beet harvesting machinery was commenced, on an appreciable scale, only about nine years ago. Considerable progress has been made since that time. Surveys made by the Sugar Beet Development Foundation indicated that the percentage of sugar beet acreage which was machine harvested increased from 27 percent in 1947 to 53 percent in 1948. However, less favorable weather and soil conditions in 1949 had as a result an increase of less than one percent in total area during this season.

Mechanization progressed at a relatively slower pace in Europe, and the continental developments tended in the direction of small units of simple construction. An analysis concerning this trend indicated that mechanization seemed to have been more completely carried out by small growers during recent years, which was largely to be accounted for by the advent of lower-priced unit machines.

Very little information on the early developments in Russia could be obtained. The Russians did not participate in any of the International Demonstration shows which were regularly held on the continent and in England. They showed, however, interest in American machines some years ago and bought a few machines in 1945.

A critical review of the status of the more successful sugar beet harvesting machines of today reveals in general the following: 1) the development and performances of the various machines have been strongly influenced by the local climatic and soil conditions of the various sugar beet growing areas; 2) the availability of hand labor in the various areas during the harvesting season has been a predominant control in the expansion toward total mechanization; 3) most of the machines are of relatively heavy construction and

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the majority of them utilize separate units for the topping, lifting, cleaning, and loading operations; 4) the majority of machines do not make use of the tops as a medium of lifting the beets out of the ground.

The purpose of this study was to investigate the possibilities of a new principle for the harvesting of sugar beets with regard to its capability of improving on the conventional machines in the following respects: 1) reducing and simplifying the units required to accomplish the removal of the tops from the beets, and the lifting and loading of both the tops and the beets at the same time; 2) reducing the amount of soil handled and the depth of plowing; 3) more effective proportional removal of the beet crown.

The basic principle of this invention is based on the utilization of two large wheels to lift the beets while they are loosened by a plowing unit, and to convey them to the cutting unit where the tops are removed. The wheels have flexible rims and are pressed against one another in such a way that they are compressed along the rear half of their circumferences and separated along the front half. The tops are gripped at a point nearest to the ground and are released at the highest point just after being sliced off from the beets.

A one-third scale model was constructed, and its performance on various types of vegetables which resemble sugar beets on an approximate one-third scale was investigated. Five separate field tests were performed but the experiment as a whole was hampered by unfavorably wet weather conditions. Valuable information was, however, obtained, which aided the suggestions and redesign of some principal features for a full-size machine.

ENGINEERING, ELECTRICAL

SPONTANEOUS OSCILLATIONS IN GAS DISCHARGE TUBES

(Publication No. 2712)*

Lawrence Edward Brennan, Ph.D.

University of Illinois, 1951

The Wehner¹ gas discharge tube has been investigated extensively to determine the mechanism by which microwave oscillations are generated in this structure. Three sets of experiments were performed. In the first it was found that the parameters of primary importance in determining the wavelength of oscillation are the intercathode spacing, anode voltage, vapor pressure, and cathode current. A systematic series of curves has been taken which shows wavelength as a function of each of these parameters. Second, the electron density and electron temperature distributions in the plasma were measured as well as the variation of these quantities with anode voltage and cathode current. Third, the effect of varying the grid structure of cathode #1 on the wavelength of oscillation was determined.

Two conclusions drawn from these experiments are of particular interest. First, it was found that the wavelength range in which oscillations can take place is determined by the vapor pressure and cathode current, while the exact wavelength of oscillation within this range is determined by the intercathode spacing and anode voltage. Second, it was found that the wavelength of oscillation is not a continuous function of the electron density at a particular point in the plasma.

Two theories had previously been advanced to explain these oscillations. Wehner, using a two gap klystron oscillator model in which the resonator gaps are replaced by oscillating layers at the plasma-dark space interfaces, obtained an equation for the wavelength of oscillation. His theory was based on two experiments, one showing the variation of wavelength with anode voltage and the other showing the velocity distribution of the beam electrons. From the new data obtained here, in particular the wavelength-intercathode spacing curves, it is shown that his equation does not correctly describe the oscillator.

* Microfilm copy of complete manuscript of 60 pages, \$1.00. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-453.

1. G. Wehner, "Plasma Oscillator," *Journal of App. Phys.*, Vol. 21, January, 1950, p. 62.

Bryant,² using a dielectric resonator model, has also obtained an expression for the wavelength of this oscillator as a function of several of the parameters. His result is also in contradiction with the data presented here.

Next, an attempt was made to explain these oscillations in terms of the potential wave theory of Bohm and Gross.³ Electron density measurements showed, however, that this potential wave theory cannot be used to describe the Wehner oscillator.

On the basis of the experimental results obtained here, it is shown how Wehner's theory can be modified to describe this oscillator correctly. According to this new theory there is an oscillating layer in each dark space close to the cathode surface, rather than at the edge of the plasma as suggested by Wehner. The beams of electrons are velocity modulated as they pass through the first oscillating layer, form bunches as they move through the space between the layers, and deliver microwave energy to the second oscillating layer. This analysis of the oscillator is not complete since neither the nature of oscillating layers nor the mechanism of feed-back from the second layer to the first is known. However, a simple model of this oscillator has been obtained which predicts the same dependence of wavelength on the parameters as was observed experimentally.

Due to the success of this klystron model, it is suggested that the next step toward understanding plasma oscillations is to investigate oscillating layers. Such layers have been observed by others, but no one has successfully explained their origin. Two types of phenomena are suggested as possible explanations of these oscillating layers. First, they might result from the localization of microwave energy in the dark spaces, and second, they might be a cathode surface phenomenon.

2. J. Bryant, "Microwave Oscillations in Gas Discharge," Thesis, University of Illinois, 1949.

3. Bohm and Gross, "Plasma Oscillations", - Physical Review, Vol. 75, pp. 1851-76, June 15, 1949; Vol. 79, pp. 992-1001, September 15, 1950.

VOLTAGE AND POWER RELATIONS IN THE SPACE CHARGE
LIMITED PARALLEL PLANE DIODE

(Publication No. 2729)*

Sorab Khushro Ghandhi, Ph. D.
University of Illinois, 1951

Previous studies in high frequency electronics have, in general, been confined to a discussion of the small signal operation of vacuum tubes. In these studies the steady state conditions are imposed on the tube, and the high frequency signal considered merely as a disturbance on this steady component. With this condition, various mathematical methods have been used to obtain results in terms of a convergent series.

The purpose of this study was to determine the current, voltage, and power relations in a parallel plane diode, operating at medium and high frequencies under space charge limited conditions. The assumptions made were:

1. A parallel plane diode is considered, and edge effects are neglected.
2. The cathode possesses an inexhaustible supply of electrons, all of which are emitted at zero velocity.
3. The mutual reaction of neighboring charges is negligible.
4. Effects due to the finite propagation time of electromagnetic waves are neglected.
5. During operation, the diode is never cut off.

The reasonableness of these assumptions has been shown, as well as their consequences. Under condition (5) the plate voltage is not subjected to reversal over a cycle, and the electron trajectories cannot touch or cross. Thus, though problems of the type involved in Class C operation are not covered by the study, the uniqueness of electron velocities allows a complete analysis over an entire cycle.

The method used is to impress a given current on the tube, and to study the voltage developed across it. The current takes the form

$$I = I_0 (1 + \mu \sin \omega t)$$

where I is constant, and μ is held within the limits 0 and 1.

Starting with Maxwell's equation for current density, and the equation of conservation of energy, the problem is set up in

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dimensionless units. The expression for voltage is obtained in the simultaneous solution of

$$32\pi^4 K^3 V(\gamma, \Theta) + \frac{1}{4}\gamma^4 + \mu^2 F_A(\gamma) + \mu F_B(\gamma) \sin \Theta + \mu F_C(\gamma) \cos \Theta \\ + \mu^2 F_D(\gamma) \sin 2\Theta + \mu^2 F_E(\gamma) \cos 2\Theta$$

where

$$F_A(\gamma) = \gamma \sin \gamma - (\frac{1}{2}\gamma^2 - 1) \cos \gamma - 1$$

$$F_B(\gamma) = (\gamma^3 - 4\gamma) \sin \gamma + (2\gamma^2 - 4) \cos \gamma + 4$$

$$F_C(\gamma) = (\gamma^3 - 4\gamma) \cos \gamma - (2\gamma^2 - 4) \sin \gamma - \frac{\gamma^3}{3}$$

$$F_D(\gamma) = (\frac{1}{4}\gamma^2 - \frac{1}{8}) \sin 2\gamma - (\frac{1}{2}\gamma^2 - 1) \sin \gamma + \frac{1}{4}\gamma \cos 2\gamma - \gamma \cos \gamma$$

$$F_E(\gamma) = (\frac{1}{4}\gamma^2 - \frac{1}{8}) \cos 2\gamma - (\frac{1}{2}\gamma^2 - 1) \cos \gamma - \frac{1}{4}\gamma \sin 2\gamma + \gamma \sin \gamma - \frac{7}{8}$$

and

$$\frac{8\pi^3 K^3}{6} = \frac{\gamma^3}{6} + \mu \cos \Theta \left[\left(\frac{1}{2}\gamma^2 - 1 \right) \cos \gamma - \gamma \sin \gamma + 1 \right] \\ + \mu \sin \Theta \left[\left(\frac{1}{2}\gamma^2 - 1 \right) \sin \gamma + \gamma \cos \gamma \right]$$

where γ = time of emission of the electron from the cathode, in radians.

Θ = time at which the behaviour of the electron is under investigation, in radians.

γ = the transit angle in radians = $\Theta - \gamma$

K = a dimensionless constant.

The voltage waveform is obtained in a Fourier series up to and including the third harmonic; from this, the total power as well as the contributions to power from the D.C. component and from the A.C. fundamental component of voltage are obtained.

Numerical examples are chosen to cover the range variation of μ . The geometrical properties of the γ versus Θ curves are investigated as an aid to the implicit solution of γ in terms of Θ . K is chosen to cover both the region where the diode exhibits positive resistance, as well as the region where the resistance is negative. A comparison is made with the Llewellyn equation for voltage and the Taub and Wax equation for power. It is seen that the results of both are in fair agreement for small signals, but this agreement is lost as the signal is increased.

THE RADIATION IMPEDANCE OF A FLANGED RECTANGULAR WAVE GUIDE

(Publication No. 2733)*

James Sanford Stephenson Kerr, Ph.D.
University of Illinois, 1951

The physical system of a rectangular wave guide terminated in an infinite, plane, perfectly conducting flange normal to the axis of the guide has been considered for some time. The situations met with in practice require that the guide be capable of supporting only the dominant ($TE_{1,0}$) mode.

The radiation conductance of this physical system has been calculated recently by assuming that the field at the mouth of the guide is unaltered from that of the sinusoidal distribution of the $TE_{1,0}$ mode. The conductance was found to be close to that observed experimentally. Earlier the radiation pattern of this system was calculated using the same assumed field and it too was found to be close to that obtained experimentally.

The object of this thesis was to calculate the radiation impedance or admittance of the flanged rectangular wave guide and at the same time to attempt to get some physical understanding of the phenomena involved if at all possible. The tangential E field at the mouth of the wave guide, which can be considered as the source of the radiated field, was assumed to be sinusoidal as had been done by the previous workers. A further justification for this assumed field was provided through an analogy developed and experimental impedance measurements.

The assumed sinusoidal distribution of the $TE_{1,0}$ mode was approximated by a field distribution which would permit integration in closed form. Image theory was used to reduce the problem to that of a rectangular, magnetic current sheet radiating into the complete space. Then the induced H, due to the magnetic current, was calculated in the plane of the sheet.

First a method was developed to determine the impedance by neglecting the higher order effects. This method was very approximate but it did give the general trend of the impedance as the various parameters of the system were varied.

Next, using the assumed tangential E and the induced H, Poynting's vector was calculated across the mouth of the wave guide to determine the complex power radiated out of the wave

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guide into the half space. It was possible to proceed from this point in two different manners.

First one could attempt to find the equivalent $TE_{1,0}$ mode voltage of the assumed tangential E distribution and use this along with the radiated power to find the admittance due to the power radiated out of the guide. This was done and the admittance was found to be very close to the total admittance presented to the wave guide as determined experimentally.

Secondly by equating the calculated conductance with the experimental or the theoretical conductance mentioned earlier one could obtain the susceptance due to the complex power leaving the guide. This was done and the calculated admittance was still closer to the experimental than that of the preceding paragraph.

Thus it was possible to conclude that the power radiated out of the wave guide, due to the assumed distribution, determined the total impedance or admittance presented to a flanged rectangular wave guide very closely. It also seems very probable that the energy stored in the evanescent modes set up in the wave guide contributes very little to the impedance presented to the wave guide since the susceptance due to the half space is so close to the total susceptance. This latter conclusion is dependent on the assumed distribution.

RADIAL BEAM VELOCITY MODULATED MICROWAVE TUBE

(Publication No. 2735)*

Chester Godfrey Lob, Ph.D.
University of Illinois, 1951

The device described in this thesis is an electron tube whose operation is very similar to that of a klystron. Although the tube was conceived as a possible means for obtaining relatively high-power oscillations in a geometry which lends itself to wide-range tunability, the primary object of this work has not been to develop an efficient device, but rather to study the behavior of the device from several viewpoints. It is, however, quite evident that such a study is necessary to fulfill developmental aims.

The tube consists of a coaxial resonator one-half wavelength long cut in the center perpendicular to its axis of symmetry. Surrounding the resonator is a ring cathode which together with appropriate focusing electrodes forms an electron gun which radially

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injects current into the resonator around its entire periphery. The inner conductor of this coaxial resonator is hollow, and it is within this hollow region that various bunching phenomena occur. Tubes of the type described were constructed and the various data associated with them compiled. On the average, the tubes gave a power output of about 3 milliwatts at a wavelength of 3 centimeters.

Since the potential distribution within the drift region determines the transit time of an electron within this region and hence the anode potential at which various electronic modes will occur, Poisson's equation was solved for this region. The analysis was reduced to a one dimensional case by stating it as follows: What is the potential and consequently the space charge distribution within a hollow infinitely long cylinder into which, and along its entire length is radially injected an electron beam of a certain current density and with a certain injection velocity? The results of this analysis are shown in the form of a dimensionless integral curve, from which the potential distribution for any conditions of injected current and injection velocity may be determined. An experiment is described to check the results of this analysis.

The space charge distribution in the drift region was also investigated under rf conditions, and again an experiment described to check the results. The results obtained were directly applicable in explaining the modulation of a second axial beam which interacted at right angles to the primary radial beam of the device. Brief mention is made of this beam interaction experiment which is known as the "Dual Beam Tube."

FOUR-TERMINAL ELECTRICAL LATTICE-LADDER EQUIVALENTS

(Publication No. 2737)*

Tarik Ögker, Ph.D.
University of Illinois, 1951

The symmetrical reactive lattice network plays an important role in the design problems of electrical filters. In practical applications it frequently is desirable, once the final filter design as a lattice has been obtained, to develop it into an unbalanced ladder structure. But ladder forms of networks equivalent to a lattice are not always possible.

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One of the problems of this thesis is the establishment of the necessary and sufficient conditions for the existence of the equivalence of lattice and structurally symmetrical ladder networks. For this purpose this thesis shows that the continued fraction expansions for the impedance arms, Z_x and Z_y , of the lattice must be identical except for one term - the final one in the expansions. This final term appears in the expansion for Z_x or Z_y depending upon the particular form of the ladder.

Stieltjes type continued fraction expansions is one way of getting the foregoing expansions. Then, corresponding to these expansions Caue type two-terminal ladders for reactive networks, Z_x and Z_y , can be obtained. The continued fractions may be expressed in other than Stieltjes form. A systematic procedure is given by Brune. Other special cases of obtaining continued fraction expansions in connection with low-pass filters are considered in this thesis.

Following the establishment of necessary and sufficient conditions for the above case, electrically but not structurally symmetrical ladders are treated. For this purpose two structurally symmetrical ladders are connected in cascade and this last case of equivalence is thereby reduced to the former case.

The next problem of this thesis is the application of the foregoing cases to the lattice-type filter design theory. In this thesis only the low-pass filter is considered since by certain frequency transformations the design of all the other symmetrical filters can be reduced to that of low-pass filter. In the lattice-type filter design theory, the impedance arms of the lattice are considered as Foster form networks, and the design procedure is based on the distribution of poles and zeros of the reactance characteristics of these arms. Because of the foregoing fact and because of the lack of a relation between the general continued and partial fraction expansions of a two-terminal impedance, the necessary and sufficient conditions, for a ladder filter equivalent to the lattice to exist, are expressed in terms of poles and zeros of Z_x and Z_y .

This thesis shows that the number of poles of transfer loss must always be equal to or greater than the number of block-band critical frequencies and all block-band critical frequencies must be located at the poles of transfer loss. Depending upon the kind of circuit elements of the series and shunt branches of the ladder filter, the Z_x and Z_y arms are either, respectively, LC- and CC- or, respectively, LL- and CL-type Foster networks.

This thesis further shows that the best lattice-type filter design with respect to impedance matching can be obtained when the actual number of poles of transfer loss is made equal to the maximum obtainable number. For this important design case the necessary and sufficient conditions are given in this thesis by separate

theorems. These theorems specify the types of Foster networks for Z_x and Z_y , the number of pass- and block-band critical frequencies, and the location of block-band critical frequencies. Then the lattice-type filter, designed according to the conditions of these theorems, can always be developed into a ladder form. For this purpose a step-by-step procedure, which is a combination of continued and partial fraction expansions is used.

ON THE CAUSES OF "SPONTANEOUS" MICROWAVE OSCILLATIONS IN GASEOUS DISCHARGES

(Publication No. 2743)*

Joseph Abraham Saloom, Jr., Ph.D.
University of Illinois, 1951

The purpose of this thesis is to continue the investigations on the causes of microwave oscillations which originate in gaseous discharges at low pressures. Since no tuned circuit external to the gas discharge is required to determine the frequency of these oscillations they are often designated as spontaneous oscillations.

The experimental investigation reported here was started with the structure first suggested by G. Wehner, since this oscillator provides good stability of operation and sufficient power output for easy measurements. By changing the various elements of the Wehner oscillator it is shown that this particular structure displays characteristics identical to the gas discharge diodes with hot cathodes investigated by the majority of the workers in the field. This result allows the conclusion that in the cases where oscillations were observed in diodes, the envelope played the part of the repeller in the Wehner oscillator.

In this work emphasis has been placed on the investigation of the r.f. properties of the discharge. A rather elaborate tube has been built for the purpose of measuring the degree of modulation of the primary beam, the relative intensity of the r.f. signal, and the phase difference between two points in the discharge.

Analysis of the signal generated by this oscillator shows that its bandwidth varies between .3% and 7% indicating that precise measurements must be confined to the regions where signals with a very narrow spectrum are generated.

R.F. probe measurements show that the signal strength is maximum in the dark spaces. Within the dark spaces the signal

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strength increases as the probe approaches the electrodes. Evidence is presented to show that the primary beam is velocity modulated. Plots of relative power output from a probe versus distance from the cathode are presented indicating uniformly spaced power peaks. A probe is placed in the beam and its d.c. potential varied. When the probe is in the beam the power output from the probe drops off rapidly if the biasing potential is made negative. When the probe is not in the beam a negative biasing potential does not affect the power picked up by the probe indicating that this power is caused by electrons impinging upon the probe.

Transit time measurements between two points in the discharge have their full meaning only if the phase difference between the two points is known. Analysis of phase measurements performed in the discharge shows that the signal is carried entirely by the bunched beam at a velocity close to the beam velocity. The fact that phase measurements between points in opposite dark spaces can be made accurately indicates that the oscillations in the different regions are definitely synchronized, the oscillator working as a single unit rather than as a multiple generator.

AN INVESTIGATION OF RESISTANCE-CAPACITANCE NETWORKS

(Publication No. 2744)*

Robert Keith Saxe, Ph. D.
University of Illinois, 1951

The properties of the driving-point and transfer admittances and impedances of a four-terminal resistance-capacitance network are derived as functions of the complex frequency variable p , and particularly in terms of the locations of zeroes and poles of these functions.

It is proved that the necessary and sufficient conditions that a prescribed short circuit transfer admittance be realizable as a ladder network of resistors and capacitors only are that the admittance must be a rational function of p with (a) negative, real and simple poles, (b) negative and real zeroes, and (c) at most one more zero than poles. A step by step process is described for designing a ladder network to realize a prescribed transfer admittance with these properties, simultaneously with a prescribed driving-point admittance whose poles are identical with those of the

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transfer admittance. The procedure consists in extracting series arm impedances from the prescribed driving point impedance such that the remainder has zeroes corresponding to the prescribed zeroes of the transfer admittance. Shunt arm admittances are then extracted with poles at these points.

Guillemin's* theorem to the effect that any transfer function prescribed at all real frequencies may be approximated arbitrarily closely by the properties of an RC network is extended to show that two ladder networks will serve. The proof follows from the fact that any polynomial (the numerator of the transfer function, for example) can be expressed as the sum of two polynomials both of which have only negative, real roots.

ENGINEERING, METALLURGICAL

RECRYSTALLIZATION AND GRAIN GROWTH PHENOMENA IN CARTRIDGE BRASS

(Publication No. 2713)**

Stanley Lyall Channon, Ph.D.
University of Illinois, 1951

A comprehensive study was made of the effects of deformation and initial grain size on the recrystallized grain size and the grain growth of cartridge brass. The recrystallized grain size was defined as the grain size existing when recrystallization was just complete, and no subsequent grain growth had occurred.

The course of recrystallization of the cold-worked material was followed by observing changes in hardness and microstructure of specimens which were subjected to isothermal annealing treatments at temperatures ranging from 250°C to 700°C for various times. Microstructures were recorded directly on Kodabromide photographic paper, and the recrystallized grain size was determined by the Jeffries method of counting the grains enclosed in a known area. The temperatures and corresponding times for complete recrystallization were recorded for determination of the heat of activation for recrystallization.

* Guillemin, E. A., "Synthesis of RC Networks," Journ. of Math and Physics, Vol. XXVIII, No. 1, April 1949, pp. 22-42.

** Microfilm copy of complete manuscript of 192 pages, \$2.40. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-454.

Grain growth was studied by annealing specimens isothermally at temperatures ranging from 400°C to 700°C for various times up to 128 days, and measuring the grain sizes by the Jeffries method.

In addition to the effects usually recognized in the recrystallization process, the relation

$$\log y = nx^{\frac{1}{2}} + \log m$$

where y is the recrystallized grain size, x is the percent deformation (i. e. percent reduction in thickness after cold-rolling) and n , m are constants.

found by Walker (Univ. of Ill. Eng. Exp. Station Bulletin 359, 1945) was confirmed for brass of different initial grain sizes.

The recrystallized grain size was found to be related to the initial grain size by the equation

$$\log y = a \log g + \log b$$

where g is the initial grain size, a is the slope of the line, and b is a function of the deformation.

The heat of activation for recrystallization was determined and was found to decrease with increasing deformation and decreasing initial grain size, and reached a lower limit of approximately 41 Kilocalories per mole. This result is in agreement with the values of 40 Kilocalories per mole found by Ke (Journ. App. Phys. Vol. 19, March 1948, p. 285), for heat of activation for diffusion of zinc in alpha brass, and for viscous slip at grain boundaries in alpha brass.

Grain growth occurred more rapidly when the recrystallized grain size was smaller, but beyond a certain annealing time, grain growth became slower and was independent of the recrystallized grain size. The grains showed a tendency to reach a limiting size, the equilibrium grain size, after long periods of annealing, but the results showed that grain growth was still continuous up to 128 days.

The heat of activation for grain growth in commercially pure alpha brass was found to be 61 Kilocalories per mole, and was independent of the prior deformation or initial grain size. This result is in close agreement with the value of 60 Kilocalories per mole found by Burke (Trans. A.I.M.E., Vol. 180, 1949, p. 73) for commercial brass.

The thesis contains 176 references.

STRESS ANALYSIS OF ARCH DAMS

(Publication No. 2715)*

Cevdet Ali Erzen, Ph.D.
University of Illinois, 1951

The stress analysis of arch dams is developed by the consideration of the strain energy expression for cylindrical shells. From the general strain energy expression, the differential equation and the boundary equations for the free edge are obtained by means of variational calculus. The differential equation and the boundary equations are simplified to contain only the normal displacement component of the shell. In this derivation, the following assumptions are made:

1. Normal unit stresses vary linearly throughout the thickness of the dam.
2. Shearing unit stresses on cross-sectional planes are the same as for flat plates and vary according to the parabolic law.
3. The deformation of the foundation is neglected.

The differential equation and the boundary equations are solved by a numerical method. The normal displacement component is expressed by a series. The terms of this series are chosen so that they satisfy the fixed boundary conditions.

The coefficients of the series are determined by satisfying the differential equation and the boundary equations at various points on the dam. In this method, the series is substituted in the differential equation and the boundary equations with the known coordinates of the points. In this manner as many algebraic equations are obtained as the number of points treated on the surface and on the free edge of the dam. The simultaneous solution of these algebraic equations gives the coefficients of the series.

The convergence of the series is studied by considering the differences in magnitude between successive approximations that are obtained by increasing the number of points. If successive differences decrease, convergence is indicated although not rigorously proved.

VITA

Cevdet A. Erzen was born in Istanbul, Turkey on May 6, 1918. He is a citizen of Turkey. After having received his Baccalaureate from the Lycee of Izmir, he attended Robert College, Istanbul,

* Microfilm copy of complete manuscript of 74 pages, \$1.00.
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Turkey, for one year before coming to the University of Illinois. In February, 1941, he received the degree of Bachelor of Science in Civil Engineering and in February 1942 the degree of Master of Science in Civil Engineering from the University of Illinois. After one and a half years of practicing civil engineering in New York City and Chicago he returned to the University of Illinois to study mathematics. In June, 1945, he received the degree of Master of Arts in Mathematics from the University of Illinois.

From June, 1945, to September, 1946, he worked for two engineering firms in Milwaukee and Chicago. During the two academic years between September, 1946, and June, 1948, he taught as an assistant in the Mathematics Department of the University of Illinois. From September, 1948, to January, 1950, he taught as an assistant in the Department of Theoretical and Applied Mechanics of the University of Illinois. From January, 1950, to June, 1950, he was an instructor in the Department of Engineering Mechanics of the New York University. In September, 1950, he accepted a position as Assistant Professor in the Civil Engineering Department of the University of Connecticut where he is teaching at the present time.

GEOGRAPHY

COMMODITY ORIGINS, TRAFFIC AND MARKETS ACCESSIBLE TO CHICAGO VIA THE ILLINOIS WATERWAY

(Publication No. 2727)*

J. Edwin Becht, Ph. D.
University of Illinois, 1951

Geography is concerned with the study and analysis of the earth's distribution patterns and with identifying and interpreting the meaningful distributional differences from place to place on the face of the earth. One of the results of such differences in distributions is trade and commerce. An understanding of trade and trade routes is contingent upon a knowledge of various relative resource and use dispositions that are requisite to the production and carrying of economic goods. Thus, in general, the pattern of traffic flow for a transportation artery is a direct result of commodity exchanges between diverse but complementary areas, the existing rate structure and other transfer costs and considerations.

* Microfilm copy of complete manuscript of 238 pages, \$2.98. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-468.

This geographic study deals with the traffic pattern of the Illinois Waterway. Its purpose is to illustrate commodity origins, traffic and markets accessible to Chicago via the Illinois Waterway as determined by applicable geonomic principles and as influenced by certain advantages and limitations inherent in barge transportation. As a strategic link in the Nation's inland waterway system the Illinois Waterway has potentialities as yet unrealized. To what degree its facilities will eventually be used can be ascertained only after the current traffic pattern has been analyzed for its principal terminus, Chicago. More than 80 per cent of all traffic on the Illinois Waterway is transhipped, originated or terminated in Greater Chicago. It is therefore intended that this work will help to make and to validate trend predictions for the entire waterway.

Conclusions resulting from this study of commodity origins, traffic, and markets accessible to Chicago via the Illinois Waterway fall into four groups. Included in the first group are some disadvantages and advantages inherent in the river-canal transportation available to Chicago shippers. These lead to a second, the recognition of certain principles of transportation that determine the character of traffic on the Illinois Waterway. A third type provides indications of traffic potential on the Illinois Waterway; and, a fourth is the generalization of market and supply zones accessible to Chicago via the Illinois Waterway. Some of these conclusions may already be well known and this paper serves to test and validate them. Others may not have been widely recognized. In any event, their inclusion has served to illustrate their significance to Chicago shippers.

The unique position of the Illinois Waterway, between important resource dispositions and the Chicago market, has resulted in barge movements of approximately 12,000,000 net tons annually. The character of the traffic included in this total is determined by disadvantages and advantages inherent in barge transportation. Although the estimated potential tonnage of commodities annually accessible to Chicago by barge is expected to exceed 30,000,000 net tons, annual increments will probably occur until the total yearly tonnage will be limited by the economic traffic capacity of the waterway which has been approximated at 15,000,000 net tons. In brief, this study of commodity traffic patterns indicates that market and supply zones accessible to Chicago via barge are able to generate a potential tonnage in excess of the capacity of the Illinois Waterway as it exists today.

RELATIONSHIP BETWEEN STRUCTURE AND
MINERALOGY OF THE SHERMAN GRANITE, SOUTHERN
PART OF THE LARAMIE RANGE, WYOMING-COLORADO

(Publication No. 2730)*

Jack Edward Harrison, Ph.D.
University of Illinois, 1951

Recent geologic studies in the Laramie Range by Newhouse and Hagner have resulted in the idea that structure of the host rock is a dominant factor controlling the composition of gneisses and schists. The Sherman granite, in the southern part of the Laramie Range, was selected for a quantitative study to determine whether any relationship existed between structure and mineral composition of a granite. The Sherman granite ranges in composition from granodiorite to granite. Three main types occur in the area studied and have been classified as coarse granite, quartz monzonite, and gneissic quartz monzonite.

The area studied covers about five hundred square miles. An attempt was made to get statistical coverage of the area by making traverses about three miles apart across the strike of the granite. Exposures in much of the region are good, but in some areas this is not the case. In addition there are places where the planar features of the granite are poorly developed or absent. These factors make it impossible to get the data necessary for complete statistical coverage. The data obtained, however, are sufficient to indicate that there is a correlation of mineral composition to structure of the Sherman granite.

Favorably oriented foliation planes in original schists and gneisses "opened" under regional stress which created low pressure areas. Introduced granitic material replaced the host rocks along these low pressure areas and produced a foliation in the Sherman granite. The attitude of the foliation of the Sherman granite was controlled by the foliation of the original rocks. Conjugate foliation planes developed in two types of Sherman granite indicating that the host rocks were "opened" in two directions. These types of Sherman granite are more "acidic" than the type which has only one foliation and was "opened" in only one direction.

Poles of foliation planes in Sherman granite were plotted on a Schmidt net and show a statistical distribution. The mineral percentages of each specimen were plotted on the foliation pole of that

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specimen, and the resulting diagrams also show a statistical distribution. A striking relationship is shown in each type of Sherman granite when a comparison is made of the structural high with the mineral distribution. Two types of relationships exist: 1) mineral distributions around structural highs, with certain mineral distributions around structural highs, with certain mineral highs coincident with structural highs, and 2) a distribution of intermediate mineral percentage values coincident with structural highs. The first relationship was recognized for gneisses by Newhouse and Hagner, and the second relationship was brought out by this study.

All distributions of minerals are believed to result from replacement in an open system. In the case of (1), replacement is more complete, and "ideal" relations of mineral percentages to structure are found or approximated; in (2), replacement is less complete resulting in greater disequilibrium due to influence of the host rock on the composition of the granite.

A new method of choosing contours for mineral percentage diagrams is suggested for rocks which have a statistically normal distribution of minerals. A new technique for determining volume percentage of minerals in coarse-grained rocks is presented.

The writer believes that the Sherman granite formed by replacement in an open system. Evidence is presented to show that the Sherman granite formed by addition of granitic material and subtraction of the original material without significant change in volume. The generalizations arrived at are believed to have universal application in metamorphic petrology.

THE STRUCTURE OF KAOLINITE AND ITS RELATION TO ACID TREATMENT

(Publication No. 2736)*

Haydn Herbert Murray, Ph.D.
University of Illinois, 1951

It has been shown in recent years that there are structural variations within the kaolinite unit layer, especially in the position of the aluminum atoms. Also, there are variations in the stacking of the individual unit layers one upon the other.

The objective of this study was to relate the structure of several kaolinites found in a variety of clays, determined by x-ray powder diffraction and differential thermal analysis, with the action

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of sulfuric and phosphoric acids and with certain physical properties. An additional problem was to determine what reaction product was formed by the reaction between each acid and the kaolinite.

The term "degree of crystallinity" was used to compare the structural variations of the kaolinites and dehydrated halloysite. This is defined to include the disorder within the crystallographic unit and the variations in stacking of the unit layers. X-ray powder diffraction data indicate many variations in the structure, especially in the stacking, and differential thermal data indicate the orderliness of the crystallographic unit. A comparison of the two methods of determining the "degree of crystallinity" was in general agreement with one major exception. Dehydrated halloysite has a very poor "degree of crystallinity" in the X-ray classification and a good "degree of crystallinity" in the differential thermal classification. This indicates that the individual unit layers are stacked with complete randomness, but that the unit layers are relatively ordered structures.

The kaolinites and dehydrated halloysite were treated with acids of varying concentrations and amounts. Until the mixture was dried at 110°C. no reaction product was indicated by X-ray photographs since both of these acids are hygroscopic and would not air dry.

The kaolinites and dehydrated halloysite, which were treated with sulfuric acid, form a hydrated aluminum sulfate as the reaction product. At 250°C. this hydrate reverts to anhydrous aluminum sulfate and at 800°C. + 50° it decomposes.

The kaolinites and the dehydrated halloysite, which were treated with phosphoric acid, form aluminum metaphosphate as the reaction product. This compound is an isotype of beta-cristobalite. X-ray powder photographs and differential thermal curves indicate that a phase change occurs in the aluminum metaphosphate between 800°C. and 940°C.

In the treatment with each of the acids, as the "degree of crystallinity" decreased, the kaolinite structure was attacked to a greater degree no matter what concentration or amount of each acid was added. The only exception to this was the dehydrated halloysite, which did not react as completely as the kaolinites with medium and poor "degrees of crystallinity." Originally, dehydrated halloysite was considered to have a structure similar to that of kaolinite. The only variation was thought to be a difference in stacking orientation; however, on the basis of the present investigation, it seems that this difference is not adequate to explain the discrepancies observed in the reaction between the acids and the dehydrated halloysite.

The kaolinites with a poor "degree of crystallinity" are more susceptible to acid treatment, since the aluminum is much easier to remove from the structure because of random stacking and

internal disorder. The kaolinites with a good "degree of crystallinity" are relatively resistant to acid attack because the unit layers are stacked with regularity which does not permit the acid to remove as much alumina; also, the aluminum atoms are more difficult to remove because of internal order of the structure.

The data suggest that the reaction of sulfuric or phosphoric acid with kaolinite is controlled to a certain extent by the structure of the kaolinite. In some cases there appears to be a structural relationship between the reaction product and the parent clay mineral.

THE STRUCTURE OF MONTMORILLONITE IN RELATION TO THE OCCURRENCE AND PROPERTIES OF CERTAIN BENTONITES

(Publication No. 2741)*

Robert Sidney Roth, Ph.D.
University of Illinois, 1951

Variations in properties of bentonite samples are related to changes in composition and structure of the dominant clay mineral in the sample, montmorillonite. Variations in montmorillonite minerals are due to isomorphous substitutions within the lattice and types of exchangeable cations within the layers.

Theoretical intensity calculations were made for montmorillonite using a multiplicity factor for three possible phase shifts multiplied by the montmorillonite structure factor and the polarization and Lorentz factors for Debye-Scherrer powder diagrams.

X-ray analyses and theoretical intensity calculations show that naturally occurring, air dried bentonites contain intimate mixtures of three kinds of montmorillonite. One kind has two molecular layers of water, the second only one molecular layer of water and the third no water at all adsorbed on the layers. "Double water layer particles" contain Ca^{++} as the exchangeable base; "single water layer particles" contain Na^+ as the exchangeable base and "zero water layer particles" are probably electrostatically neutral.

Calculations of the structure factor show that no untreated Na-montmorillonite should have a (003) or (005) diffraction line on an X-ray powder diagram. (003) lines which have been reported at 4.08 \AA^0 are due to a cristobalite interference at 4.10 \AA^0 . The (002) diffraction line is characteristic of the distribution of adsorbed water layers, however, it cannot be found by ordinary X-ray methods

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except for samples very high in one particular constituent. The (001) diffraction line is often asymmetrical due to the presence of different types of adsorbed water layers. Data obtained from the (001), (002) and (004) diffraction lines are used to estimate relative percentages of the kinds of montmorillonite layers present. Relative intensities of the (hk) lines might be related to the crystallinity of the montmorillonite. Less randomly oriented samples, with a high percentage of zero water layer particles, would produce more intense and symmetrical peaks.

Drilling mud yield values of bentonite samples are correlated with data obtained from the (001) diffraction line. Best yields come from bentonite samples with a (001) 'd' value between 12.85 \AA and 12.5 \AA and with asymmetry values between .4 and .8. Samples with very symmetrical (001) peaks are very pure in one component and show poor yields. A certain amount of exchangeable Ca^{++} is needed in a clay water system to produce a good drilling mud because a few "double water layer particles" create enough disorder in the system to allow dispersion to take place more easily. A maximum yield is obtained from a bentonite sample with a certain definite Na/Ca ratio. Heating of bentonite to 350°C . is detrimental to swelling properties because much of the exchangeable Ca^{++} is fixed while the Na^+ remains exchangeable.

Isomorphous substitution of Ca^{++} in the montmorillonite central layer distorts the lattice structure causing a contortion of the layer, creating disorder in the system and making dissociation of the clay layers easier. Oxidation within the montmorillonite lattice occurring under near surface weathering conditions might transform ferrous ions in the gibbsite layer into ferric ions, expelling some of the latter, thus accounting for the color change in weathered bentonites. Assuming an epigenetic replacement phenomenon for the tetrahedral substitution of $(\text{OH})_4$ for SiO_4 in montmorillonite, silica thus liberated from the lattice may be driven into the shale below the deposit forming the observed siliceous floor of the "Clay Spur" Wyoming bentonite. This type of replacement may also account for cristobalite in bentonites.

Properties of bentonites vary with the nature of the montmorillonite mineral and are dependent upon the proportion of exchangeable Na^+ and Ca^{++} ions as well as types of isomorphous substitutions which, in turn, may be partially related to weathering and near surface alterations in the bentonite deposit.

THE MORPHOLOGY, ONTOGENY, AND CLASSIFICATION
OF THE OSTRACOD FAMILIES BAIRDIIDAE, CYPRIDAE,
CYTHERELLIDAE, AND HEALDIIDAE

(Publication No. 2746)*

Robert Harold Shaver, Ph.D.
University of Illinois, 1951

The order Ostracoda includes one of the most common groups of microfossils, being abundantly represented from Ordovician to Recent. A great many of the most important forms are smooth, convex-backed, relatively undifferentiated ostracods belonging to the families Bairdiidae, Cypridae, Cytherellidae, and Healdiidae, three of which are represented in the Ordovician and at present. Orientation, morphology, ontogeny, classification, and individual variation of these families are primarily considered.

Although modern representatives are abundant, many fossil species have been incorrectly oriented resulting in erroneous descriptions and classification. Features of value for orientation are discussed for the first time as applied to this particular group. Seven features deal with morphology of the adult. An eighth feature deals with the morphological changes during development.

Much of the previously known morphology is summarized, and in addition, new morphological information is presented. Some of the latter follows: 1) exact nature of valve overlap in several genera, 2) shell thickness in numerous species of 19 genera, 3) structural details of the shell wall in some species, 4) ornamentation as related to shell thickness and body structure, 5) muscle scar patterns for species of Bairdia, Carbonita, Cavellina, Cytherelloidea, Healdia, and Waylandella, 6) sexual dimorphism in Bythocypris, Carbonita, and Healdia, and 7) detailed descriptions of marginal zone and hingement in species of Bairdia, Cytherella, and Healdia, and additional information for numerous other species. Much of this information is revealed through sectioning and five plates of illustrated sections are presented.

The value of ontogenetic studies in the families under consideration is discussed. Such studies are presented from the following viewpoints. 1) Ontogeny in modern species is reviewed and related to phenomena observed in fossils. 2) The number of instars is probably nine for all fossil and modern members. 3) The growth formula embodied in Brooks' Law is applied to nine fossil and one

* Microfilm copy of complete manuscript of 272 pages, \$3.40. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-487.

modern species. 4) Detailed morphological changes for known instars are discussed for these ten species representing the four families. In addition to other species, each of the ten are illustrated by drawings, photographs, and charts showing length-height measurements. Known instars in the genera studied in detail have not previously been described.

A study of size variation in many modern species based on anatomy of the living animal is presented and the findings applied to and compared with fossil species. Population studies yield much information bearing on proper erection of fossil species. These show how the form ratio may properly be used, the degree of size variation to be expected in a specific population, and sexual dimorphism if it is present.

A summary of the development of the pertinent portion of the ostracodal systematics is presented which indicates that much of the classification in use at present is artificial, of little value, and outmoded. New information of a morphological and ontogenetic nature first presented here and elsewhere makes the position of many, originally incompletely described genera more certain in a phylogenetic classification. Particularly, the classification of genera with affinities to *Healdia* and variously assigned to the Healdiidae, Cytherellidae, and Bairdiidae is clarified. Family descriptions including all members are given and which for the first time furnish at least a morphological basis on which phylogeny can be expressed for fossils. The proposed rearrangement of the taxonomic structure is shown pictorially in a plate indicating the stratigraphic and phylogenetic relationships. Original descriptions and illustrations of nearly all genera which have been seriously considered at some time as belonging to families under consideration are included, and where warranted, emended generic descriptions are made.

ERNEST RENAN: HIS ROLE IN THE
CULTURE OF MODERN FRANCE

(Publication No. 2797)*

Dora Beirer, Ph.D.
Columbia University, 1951

Cultured Frenchmen who reached maturity in the last third of the nineteenth century derived a substantial part of their intellectual nourishment from Ernest Renan. They honored him as one of their greatest "masters." His scholarly eminence, and the challenging variety of his opinions, won him wide popularity.

Renan had acquired solid learning not only in philology which was his specialty, but in history, philosophy, archeology, religion, art, and literature. In his writings, which total over forty volumes, he ranged freely over these subjects, and offered illustrations and suggestive analogies in a thought-provoking manner. And the presentation was always attractive, for he was one of the best French writers of all time.

The puzzling aspect of his influence is that he was claimed as patron and master by adherents of antagonistic cultural groups, of warring creeds, of rival political factions. It seems at first sight strange that patriots and internationalists, humanists and racists, freethinkers and worshippers, monarchists and republicans, should all assert that Renan inspired their thoughts and actions. The explanation for these contradictory pretensions is found in Renan's personality and in the nature of his work.

Renan did not produce an original philosophy. He founded no "school" and had no disciples. His role in the culture of modern France consisted in provocative discussion of certain pivotal issues of the nineteenth century: the philosophy and politics of Germany, science, religion, monarchy. Renan's characteristic trait was a kindly interest in all creeds, theories, and ideas. This intellectual hospitality was variously decried as dilettantism or valued as philosophic doubt. Its imitation by young admirers was dubbed "Renanisme." It provoked contradictory judgments, but stimulated thought. That was Renan's aim.

His own philosophic convictions furnished no practical guidance. He was steadfast in the accomplishment of his duties as scholar, in his belief that the world serves some ideal purpose.

* Microfilm copy of complete manuscript of 239 pages, \$2.99.
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But among rival factions he would not choose, for fear of excluding a part of that Truth which was the constant aim of his search.

As a young scholar, Renan came to admire German philosophers and scientists, and to advocate their qualities. The Franco-Prussian war was a dreadful blow to his ideal; but nevertheless he called for reform in France on the Prussian model. To him, admiration for Germany and love for France were not incompatible. Most modern Frenchmen lacked his equanimity.

In the realm of philology which was his "science," Renan was drawn into a discussion of race. His name was associated with that of Gobineau and he was claimed as a forerunner of modern racists. The publication of the Future of Science in 1890 prompted the votaries of materialism and scientism to praise him as an apostle of their creed.

Renan reached universal fame through his Life of Jesus. It was meant to be the biography of a great man, written by a devoted admirer who had once been destined for the Church. It was denounced as blasphemy, but also acclaimed as a challenge against Church censorship of scholarly research. The battle was from its inception political, rather than academic or religious. Accordingly, under the Third Republic, Renan was raised to a position of official eminence.

In politics, Renan advocated constitutional monarchy, a compromise from which both republicans and monarchists drew inspiration, but which satisfied neither. This is symbolic of Renan's position in modern France. The true Renan is distorted, for he lived above faction, in the realm of disinterested scholarship, benevolent toward all, committed to none.

READING INTERESTS AND THE BOOK TRADE IN FRONTIER MISSOURI

(Publication No. 2877)*

Harold Holmes Dugger, Ph.D.
University of Missouri, 1951

Most early Missourians were products of intermediate frontiers. Successive moves westward brought slackening but not abandonment of intellectual interests. Reading interests in newly-developed communities differed little from those of eastern areas in extent.

* Microfilm copy of complete manuscript of 395 pages, \$4.94.
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Most contemporary observers noted a dearth of libraries and of general intellectual interests in frontier Missouri. Modern research has indicated, however, that the early French population included several owners of libraries ranging to over 300 volumes in size. A sampling of county probate records indicates that approximately one-third of the frontier homes contained books. Nearly three-fourths of the collections numbered less than ten titles, while less than fifteen per cent included over twenty titles. Percentage of book ownership was highest in the earlier-settled, prosperous, agricultural areas of central and eastern Missouri, and lowest in later-developed northern and southern sections of the state. No marked increase in incidence of book ownership or size of libraries characterized the frontier period.

In content, no "typical" library existed. Although major interests were in religious, historical and practical materials, even among the smallest collections a wide variety of titles appeared. Larger collections belonging to non-professional people indicated that historical and related subjects were favorites, replacing religious materials which held first place in smaller libraries. Modern literature was much more prominent. A more liberal sprinkling of ancient classics, scientific treatises, philosophical works and periodical publications appeared. Interest in contemporary American literature and history gradually came to rival that in English and European materials.

Lawyers and doctors owned many of the largest libraries in the frontier period. Their collections frequently included a variety of miscellaneous literature. Lawyers were perhaps the best read professional group. English and American reports and subject-matter treatises appeared in number in most of them. History, biography and literature, after professional material, were chosen most frequently. Doctors, while less likely to own general literature, usually had treatises on surgery and a wide range of problems in medical practice. Most doctors tried to keep abreast of current developments by reading professional periodicals. Ministers and teachers, somewhat less likely to have extensive collections, concentrated most heavily upon their professional literature.

Reading interests were so diverse that attempts to designate favorite titles is largely defeated. Standard English literary productions and histories, American and English biographies, and standard reference works ranked after the Scriptures and works of scriptural reference in popularity. American literature grew slowly but steadily in favor. With a few notable exceptions, frontier Missourians' favorites corresponded to those of readers the country over.

Efforts to establish semi-public libraries were not notably successful. A number of early rural projects suffered serious

difficulties, and only as frontier conditions waned were the first lasting institutions founded in larger towns. In content, such collections early emphasized informational and utilitarian values, but soon accorded an important place to recreational materials.

Reading preferences were shaped, in part, by individual educational, occupational and philosophical backgrounds. In addition, special forces were operating to shape such preferences. Schools, churches, the press, and miscellaneous cultural institutions popularized types of literature and, occasionally, warned against indulgence in reading certain materials.

Opportunities to purchase books were present from an early date. The general mercantile firm was the most important agency for book distribution in rural areas throughout the frontier period, although estate sales, public auctions, religious agencies, traveling booksellers and subscription publishing played their parts. Specialization in retailing books began as population centers developed. Book offerings steadily expanded in volume and variety and were widely advertised. By the end of the frontier period books were generally available soon after publication.

**THE HISTORY OF THE GERMAN SOCIAL
DEMOCRATIC PARTY EXECUTIVE, 1933-1945
A STUDY OF A POLITICAL EXILE GROUP**

(Publication No. 2810)*

Lewis Joachim Edinger, Ph.D.
Columbia University, 1951

This study of a political exile group deals with the efforts of the exiled executive of a party which, for two decades prior to 1933, had been Germany's largest, to organize and lead a revolution against Hitler. Based primarily upon publications of the executive and other exile groups, supplemented by numerous interviews, the history of the group — known as the Sopade — is divided into three phases, preceded by an extensive introduction.

The introduction traces the evolution of the conflicting ideas and groups which existed in the German labor movement to 1933 and details the events leading up to the prohibition of the Social Democratic Party in June, 1933. During the First Phase of the Sopade's history prominent leaders of the old party reestablished its executive in Prague with the intention of organizing and directing

* Microfilm copy of complete manuscript of 530 pages, \$5.63. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-547.

from there a revolutionary Social Democratic movement in Germany. An elaborate organization was set up abroad dedicated to awakening and consolidating anti-Nazi sentiment through underground newspapers and pamphlets, ultimately to lead to a popular uprising against the Nazi regime for the restoration of a liberal democratic regime. The Sopade, its ambitions and plans, were challenged, however, by exiled representatives of a number of left-wing "revolutionary-socialist" groups who called upon the old leaders to abdicate and to surrender the leadership to them. This pressure induced the executive to modify its position during the Second Phase. It sought to silence these critics by including some of them in the executive and by incorporating many of the ideological and tactical concepts proposed by the former in its program. Developments during the Third Phase revealed, however, that the differences between the old leaders and their left-wing critics were far too fundamental to permit them to work in harmony. Many of the left-wing Social Democrats sought cooperation with the Communists whose United Front campaign of 1934-1935 was the catalyst accelerating the disintegration of the Social Democratic exile movement. The reformist majority in the executive opposed the United Front, broke with the left-wingers, and discarded the "social-revolutionary" ideas introduced by them during the Second Phase. Claiming to hold a "mandate" from the outlawed party in Germany, the executive, isolated from other exile groups, espoused a mild form of reformist socialism.

The Fourth Phase which began in 1936 saw the final failure and collapse of the Sopade's ambitions. Previous optimism regarding an imminent revolution in Germany gave way to pessimism and the conviction that Germany was headed for war and destruction in view of the lack of opposition to the aggressive moves of the Nazi regime. The steadily deteriorating political and economic situation of the exiles served to aggravate the centrifugal forces which were dividing groups and individuals. Forced by German pressure on the Czechoslovak government to move to Paris in 1938, the executive engaged in bitter disputes with other exile groups and preferred virtual isolation to collaboration with organizations whose ideas it conceived as alien to the principles of Social Democracy. Thus the fall of France in 1940 was only the physical blow which just about ended the existence of a group which had been reduced to a small faction of embittered exiles. Between 1940 and 1945 little more than the name of the executive was kept alive in London by two survivors.

When the Social Democratic Party was reorganized after the War individual exiles returned from abroad, but the Sopade was not acknowledged as the link between the old and the new party, and the "trusteeship" which it had claimed during the Hitler period was not officially recognized.

The failure of the exiled executive's effort to lead a revolutionary movement against the Third Reich was attributable to its inability to serve as a core for such a movement, the activities of the German Communists, lack of support abroad, and perhaps above all to the invulnerability of the Nazi regime to revolution.

ELIAS CORNELIUS BOUDINOT

(Publication No. 2812)*

Lois Elizabeth Forde, Ph.D.
Columbia University, 1951

Elias Cornelius Boudinot was a half-breed Cherokee Indian whose career embraced the years 1860 to 1890, a period which witnessed the major events culminating in the formation of the State of Oklahoma: the splitting of the Five Civilized Tribes of the Indian Territory into Union and Confederate factions during the Civil War; their post-war treaties with the United States, which by providing for land cessions made possible the concentration of the Plains Indians within the Indian Territory; and the long, successful agitation of railroad interests and land-hungry farmers for the opening of the Indian Territory to white settlement. Boudinot played an important part in all these events as an advocate of the establishment of a territorial form of government in the Indian Territory, the allotment of a homestead to each individual Indian, and the opening of the remainder of the Indian Territory to white settlement.

In advocating this policy Boudinot, who had spent most of his life among white people and become thoroughly inoculated with their spirit of individual enterprise, sincerely believed that by bringing that spirit to the Indian Territory he would best serve the interests of the Cherokees, a majority of whom, devoted to their ancient tribal institutions, regarded him as a traitor to his race.

Boudinot's career was greatly influenced by a tribal feud which began when his father signed the treaty whereby the Cherokees gave up their Georgia lands in return for the Indian Territory west of the Mississippi. For violating the tribal blood-law which decreed death for any Cherokee who sold any portion of the tribal lands, the elder Boudinot and other signers of the treaty were murdered, and a bitter political struggle, often breaking into open warfare, ensued between the Treaty Party and the majority of the

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Cherokee Nation, led by Principal Chief John Ross. The breach was never fully healed, and during the Civil War the Cherokees were split into Confederate and Union factions along essentially the same family lines as had been formed during the removal crisis. The Treaty Party, composed mostly of slaveowning half-breeds, favored the South. Elias C. Boudinot served as a Lieutenant-colonel in the Confederate army and as delegate of the Cherokees in the Confederate Congress.

After the war, however, Boudinot allied himself with those in the North through whose action he hoped to secure the enactment of the policy which he advocated for the Indian Territory. In support of this policy Boudinot, an accomplished orator, lectured throughout the United States and lobbied in favor of the bills providing for the establishment of a territorial government which were constantly before Congress in the 1870's and 1880's.

Following the publication of a Senate committee report in 1879, which in general confirmed the charges that advocates of a territorial government were working in the interest of the railroads to whom the United States in 1866 had made huge land grants in the Indian Territory conditional upon extinction of the Indian titles, Boudinot changed his tactics and began to work closely with the Boomers, an organization of farmers who sought to open the Oklahoma Lands in the center of the Territory to white settlement by invasion in force. The agitation was successful and the lands were opened in 1889.

During this period white people had been moving into the inhabited portion of the Territory, and soon outnumbered the Indians. Since they had no civil or political rights under the Indian governments these whites joined Boudinot and the Boomers in the clamor for the abolition of these governments and the organization of the Indian country as a regular United States Territory.

Soon after Boudinot's death in 1890 Congress established the Dawes Commission, which forced the Five Civilized Tribes to accept allotment in severalty. In 1898 the Curtis Act abolished the tribal governments. The way was open for the admission of the Oklahoma and Indian Territories as a single state in 1907, and the policy which Elias Cornelius Boudinot had done so much to promote had become an accomplished fact.

A COMMONER'S JUDGE
THE LIFE AND TIMES OF CHARLES PATRICK DALY

(Publication No. 2818)*

Harold Earl Hammond, Ph.D.

Columbia University, 1951

Charles Patrick Daly, a leading jurist in the courts of New York City during the last half of the 19th century, was Associate Justice, First Judge, and Chief Justice of the Court of Common Pleas for the City and County of New York during a period of great commercial and national development. Not only was Judge Daly prominent as a jurist, partaking in the reorganization of the courts of the State of New York by his role in the Constitutional Convention of 1867, but he was a prominent scholar and citizen during the period.

As President of the American Geographical Society from 1864 until his death in 1899, Daly made a substantial contribution to geographical exploration and discovery in an era during which the Arctic region and the wilds of Africa were being discovered. He worked with such explorers as Hall, Hayes, Du Chaillu, Stanley, and Peary and knew personally the great Alexander von Humboldt. Daly's constant devotion to the American Geographical Society resulted in establishing the infant organization on a sound footing financially as well as in learned circles. As President, Daly was also able to earn a reputation for himself as an authority on geographical matters, and his annual addresses before the Society and the public were highly regarded by all.

In addition to his judicial and geographical work, the fields in which he made his principal contributions, Daly worked in many other areas and contributed substantially to each. His role in politics, in civic movements, in philanthropic efforts, and in the social life of the era cannot be subordinated. As an orator, he always satisfied his audience with his delivery and the appropriateness of his remarks. By virtue of this quality, he became the major-domo of civic functions, and the public officials of the city found him as ready to entertain diplomats over a banquet at Delmonico's as to direct a political rally. Most religious, civic, and social organizations felt they could turn to Judge Daly to deliver the principal address of the evening, and he was invited, at one time or another, to accept the presidency of some thirty of them.

* Microfilm copy of complete manuscript of 464 pages, \$5.80. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-555.

Not least among Daly's merits was his recognition as a scholar. He was generally recognized throughout the nation as a scholar in law, political science, diplomacy, drama, Shakespeare, Columbus, all geographical matters, and Irish lore and history. He wrote on each of these topics, and though his scholarship in only two of them remains of significance today, his interest contributed to the progress of learning in all these fields.

LORD ADMIRAL THOMAS SEYMOUR

(Publication No. 2701)*

Owen C. Lease, Ph.D.
University of Pennsylvania, 1951

The history of England in the sixteenth century is largely synonymous with the history of the House of Tudor in that century. From the late fifteenth until the early seventeenth centuries the Tudors sat upon the English throne. Edward VI, youngest of the five Tudor sovereigns, ruled in the very middle of the century from 1547 until 1553. During his entire reign Edward was a minor ruling under the guidance of others. This factor made for a reign marked by continual intrigue bent toward gaining control over the king. One of the most celebrated of the conspirators was Lord Admiral Thomas Seymour.

Born in the first decade of the century Seymour was a member of one of the important families of the Tudor Period. His sister, Jane, became Henry VIII's third wife and the mother of Edward VI. Edward, his eldest brother who is better known as the Duke of Somerset, became Lord Protector of England during the early years of the young king's rule. In the later years of the reign of Henry VIII Seymour served that monarch in various military and naval capacities. With the accession of Edward VI he was advanced to the peerage as Baron Seymour of Sudley and became Lord Admiral of England. Not content, however, he began to use his position as the king's uncle and as a member of the council in an effort to take from his brother, the protector, the governance of the realm. The effort failed, but it severely weakened the protector's position as well as causing Seymour's execution in 1549.

While this work is an attempt to give in so far as is possible a complete account of the life of Thomas Seymour, its essential contribution to historical knowledge lies in the chapters dealing with

* Microfilm copy of complete manuscript of 173 pages, \$2.16. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-442.

the reign of Edward VI. Past historians have been inclined to use Seymour as a mere pawn in their accounts of the major figures of the reign. For this reason he has been badly misrepresented in many instances, but more importantly those first rank figures with whom he was associated have suffered from a like misrepresentation because of historians' lack of knowledge about Seymour's aims and desires. Without trying in any way to justify Seymour's conduct the author has intended in the following work to clarify the admiral's activities, thereby throwing a more searching light upon portions of the careers of such famous figures as Katharine Parr, Queen of England; Princess Elizabeth, daughter of Henry VIII and later Queen of England; King Edward VI; and other prominent persons of the reign.

RUSSIA'S JAPAN EXPEDITION OF 1852 TO 1855

(Publication No. 2831)*

George Alexander Lensen, Ph.D.
Columbia University, 1951

The reopening of Japan (1854) by Commodore Matthew Calbraith Perry was facilitated by the activities of the Russian Japan Expedition under the command of Evfimii Vasil'evich Putiatin. Convinced that the establishment of a strong Russian position in Eastern Asia presupposed good relations with Japan, the Russian government had dispatched Putiatin to Japan to attempt to establish political and commercial relations with the latter and delineate Russo-Japanese boundaries.

Off and on, from August 21, 1853 until July 14, 1855, the Russian mariners were in contact with the Japanese. In spite of Japanese procrastination, the outbreak of the Crimean War and the reduction in size of the expeditionary force, the shipwrecking of the *Diana* — then the only vessel of the expedition —, and other obstacles Putiatin accomplished his mission. On February 7, 1855 the Russo-Japanese Treaty of Amity and Friendship was signed. Like the American treaty with Japan it provided for the protection of shipwrecked persons and vessels in distress, the opening of certain ports and the right to purchase supplies in them, the appointment of consuls and most-favored-nation treatment. It went beyond the American treaty in obtaining the opening of three ports (Shimoda, Hakodate and Nagasaki) instead of two (Shimoda and Hakodate) and

* Microfilm copy of complete manuscript of 259 pages, \$3.24. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-568.

permitting the appointment of consuls at Hakodate as well as Shimoda, delineating Russo-Japanese boundaries and providing for extraterritoriality.

Putiatin's approach appeared more moderate and peaceful than Perry's. Japanese statesmen, therefore, began to contemplate concessions to Russia in return for Russian protection against all other powers. Putiatin was in fact promised that "should our country (Japan) permit trade, it will be first to your country (Russia)," but inadequate communications prevented the realization of this pledge. Putiatin proclaimed: "In the event that people from other countries cause violent disturbances we are prepared to give you any assistance."

Continued contact between the Japanese and Russians, particularly after the shipwreck of the latter, furthered mutual respect and understanding. But the diaries of Goncharov, secretary to Putiatin, and Kawaji and Koga, Japanese plenipotentiaries, widely read in Russia and Japan respectively, emphasized differences rather than similarities, ridiculed rather than praised the other side; they helped lay the foundation for the myth of Russo-Japanese "historical" enmity.

LEMUEL SHAW

CHIEF JUSTICE OF MASSACHUSETTS, 1830-1860

(Publication No. 2832)*

Leonard Williams Levy, Ph.D.
Columbia University, 1951

No American jurist outside the Supreme Court of the United States, and few who have been members of that body, exercised a more profound influence on American law than Lemuel Shaw of Massachusetts.

Twenty-six years of legal practise and experience in public affairs prepared Shaw for his judicial career. He spent eight terms in the state legislature as a Federalist; was a member of the Massachusetts constitutional convention of 1820; served on the commission to revise the state laws; and wrote Boston's first city charter. When appointed to the bench in 1830 at the age of fifty, Shaw was the leader of the Massachusetts bar and a self-made man of property.

* Microfilm copy of complete manuscript of 390 pages, \$4.88. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-569.

His Chief Justiceship coincided with three decades of social and industrial ferment, during which time new problems for adjudication insured him an opportunity to mould the law. Although stylistically discursive, Shaw could knife to the point of a controversy, explain its governing principle, and boldly generalize in the manner of the trailblazing judge. Of his 2,200 opinions, which illuminated almost every branch of law, only one was a dissent.

Many of Shaw's cases excited public interest. His decisions bearing on the schism among Congregationalists shifted valuable properties to the Unitarians and hastened the separation of church and state in Massachusetts by driving the Trinitarians into the disestablishment party. Shaw's decision against the extension of interstate comity to laws recognizing slavery freed all non-fugitive slaves coming into Massachusetts, even if in transit. In the case of fugitives Shaw's loyalty to the Constitution and to compromise measures overcame his anti-slavery sentiments; he remanded runaways and upheld the constitutionality of the 1850 Fugitive Slave Act. He also originated the "separate but equal" doctrine to justify segregation of Negroes.

Shaw deeply influenced the growth of railroad law. He formulated the rights, duties, and liabilities of railroads as common carriers of freight and passengers, and established rules governing accident cases. Anticipating the public interest doctrine, he upheld the exercise of eminent domain by railroads on ground that they were public works, and on similar ground, sustained government regulation. The practical effect of many of Shaw's doctrines promoted railroad development; indeed, the law in Shaw's hands was as putty, shaped to meet the press of railroad needs. Significantly, the fellow-servant rule developed out of a case in which the employer was a railroad: Shaw generally preferred industrial to individual interests, and many of his opinions represented a retrogression in the humanization of the law of torts.

His influence on constitutional law is found chiefly in his expositions of the police power, whose potentialities for promoting the public welfare he early recognized. Although a nationalist Shaw construed the state police power broadly, delivering influential opinions on its relations to property rights, the contract and commerce clauses, and due process of law. He found limitations on government in the undivestibility of a vested right and in the personal rights guaranteed by the state constitution.

Justice Holmes wrote of Shaw that "few have lived who were his equals in their understanding of the grounds of public policy to which all laws must ultimately be referred." Shaw's tendency to decide questions broadly explains much of his power, and his habit of writing treatises on the issues involved, much of his influence. His contribution consisted in making the law practical

and plastic, thus accommodating it to community requirements as estimated by enlightened conservatism.

**A HISTORY OF AMERICAN CATHOLIC OPINION
ON THE THEORY OF EVOLUTION, 1859-1950**

(Publication No. 2894)*

John Lee Morrison, Ph.D.
University of Missouri, 1951

American Catholics were divided, not united, in their attitude toward evolution. In the absence of an infallible pronouncement by the Church, Catholic reactions to the theory were as diverse as those which characterized Protestant opinion. Catholics, however, generally disclaimed any connection with Protestant thought and endeavored to establish an independent position.

Although Catholic writers followed closely the trends in secular thought, they did not exercise much influence upon them. With a few exceptions, they wrote solely for a Catholic audience.

Except for the mutation theory of evolution, Catholics tended to be critical of developments in non-Catholic scientific and philosophical opinion. The Synthetic Philosophy of Herbert Spencer, the materialism of Thomas H. Huxley, monism as expounded by Ernst Haeckel, the Social Gospel movement led by Lyman Abbott, and agnosticism as exemplified by Clarence Darrow were all condemned by Catholic apologists. Social Darwinism or any attempt to interpret morality on the basis of evolution also encountered implacable Catholic hostility.

Many Catholics were evolutionists, but a Catholic Darwinist was a rarity. Darwinism, whether conceived as the concept of natural selection, as the idea of man's descent, or as a mechanistic philosophy, was usually rejected in favor of a more patently theistic version of evolution.

The long-range tendency of Catholic thought was toward increasing toleration of the evolutionary concept. The initial Catholic reception of Darwinism was mixed, with Orestes Brownson steadfastly opposing it and American disciples of the English evolutionist, St. George Mivart, displaying a tolerant attitude. Dependence upon Europeans who were avowed believers in evolution became a trait of American pro-evolutionists, who frequently stopped short of open acceptance of the evolution theory.

* Microfilm copy of complete manuscript of 413 pages, \$5.16. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-630.

From 1873 to 1880, Catholic spokesmen concentrated upon denouncing the antichristian implications which had been drawn from the Darwinian hypothesis. Having associated Darwinism and materialism, they were inclined to dismiss evolution as a scientific absurdity. The publication of the Descent of Man, the growing vogue of Spencer, and the spread of materialistic philosophies were chiefly responsible for this Catholic opposition.

During the eighties and nineties, as part of the Americanism movement, a band of liberals headed by Fr. John A. Zahm of Notre Dame did yeoman work in advocating the scientific probability and theological respectability of the evolution theory. Three major contentions comprised the liberals' program: evolution was scientifically more valid than special creation; the evolution of Adam's body was a tenable hypothesis; the Fathers of the Church, particularly St. Augustine, were evolutionists.

These views were resisted by the conservative party headed by Archbishop Corrigan of New York, and the struggle over evolution was carried to Rome. There the conservatives succeeded in getting a decree against Fr. Zahm's Evolution and Dogma from the Congregation of the Index. While this decree was never published, Rome's action was publicized in America by the conservatives. This affair served to delimit for Catholics the extent to which evolution might be held. As applied to plants and animals, the theory was acceptable; as applied to man, it was not.

After 1900, the Zahm affair and the DeVries theory contributed to the popularity of the views of Fr. Erich Wasmann, a German Jesuit. "Wasmannism" signified acceptance of the mutation theory, rejection on scientific grounds of human evolution, affirmation of the orthodoxy of evolution, portrayal of St. Augustine as an evolutionist, and condemnation of monism and Darwinism.

Since World War I, Catholic writers have quarrelled principally over human evolution. One group led by Fr. O'Brien attempted to overthrow the Zahm precedent, while another headed by Fr. Le Buffe wrote prolifically against the idea of man's descent from lower animals.

ROBERT PARSONS, ENGLISH JESUIT

(Publication No. 2848)*

John Edward Parish, Ph.D.
Columbia University, 1951

This study outlines the political career of Robert Parsons between 1580 and 1610 and examines the theory often advanced by Roman Catholic historians that the persistent "legend of the scheming Jesuit" was based largely on the intrigues of this one man. In addition Parsons' literary works are examined to determine why they provoked immediate replies from such men as Launcelot Andrewes, John Donne, and James I, why some of them were reissued by Anglicans and Puritans late into the seventeenth century, and whether they justify the high commendation which Jonathan Swift passed on the prose style of the Jesuit author.

Presented chronologically, the biography sketches first the condition of English Catholics at home and in exile during the early years of Elizabeth's reign, before Parsons left Oxford and joined the Society of Jesus. The second chapter covers the period in 1580-81 when Parsons and Edmund Campion, back in England in disguise, were publishing books at a secret press. Succeeding chapters deal with the Jesuit's collaboration in plots to depose Elizabeth and place the Queen of Scots or the Infanta of Spain on the throne, with his efforts to prevent the accession of James I, with factions forming within the party of English Catholics, and with the intensified persecution following the discovery of the Gunpowder Plot. Since Parsons' activities against Elizabeth and James — in London, Paris, Madrid and Rome — were notorious at the time when Spenser and Shakespeare were writing, his story provides background material valuable to a better understanding of some of their works. The author has found the study particularly useful as a gloss to Ignatius His Conclave, John Donne's satire of the Jesuits.

The author concludes that anti-Jesuitism in England was part of an international prejudice against the Society of Jesus and that Parsons, though the most prominent, was only one of many English members of the Society whose political activity aroused strong resentment among Catholics and Protestants alike. Utilitarianism, rather than sincere conviction, led Parsons to advocate a doctrine of popular sovereignty in the most incendiary of his books, from

* Microfilm copy of complete manuscript of 221 pages, \$2.76. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-585.

which republicans later drew arguments to justify their rebellions against Charles I and James II.

It is further concluded that although Parsons was capable of writing clear, forceful English prose, free from the affectations of the age, most of his books were on a literary level no higher than that of the average Elizabethan and Jacobean polemicist. His one non-controversial work, the *Christian Directorie*, however, contains passages of exquisite rhythm and poetic imagination. Both the original version and a Protestant adaptation remained popular throughout the seventeenth and eighteenth centuries and deserve consideration in any study of English devotional literature.

THE HISTORIES AND HISTORIANS OF CENTRAL AMERICA TO 1850

(Publication No. 2738)*

Franklin Dallas Parker, Ph.D.
University of Illinois, 1951

The writing of the history of Central America was begun in 1524, two years after the start of the Spanish conquest. It has continued to the present day. Starting in the last quarter of the nineteenth century, a number of critical works have been produced by both Central Americans and foreigners, which have shed new light on the frequently dark pages of Central American history. Much of the history written before 1850, however, has never been revised. The works produced during the colonial and early national periods are therefore the most authoritative literature available concerning many phases of Central America's past. Whether they will hold up under critical examination or not, they must be taken into account by the modern student who chooses to do work in this field. It is the purpose of this study to provide a comprehensive review of this literature, for the convenience of anyone who chooses to direct his attention to the field of Central American history.

An attempt has been made to include all the works written before or during the year 1850 which have been in any way a contribution to Central American historiography. To make the list as complete as possible, the library facilities of the University of Illinois have been supplemented by those of Harvard University and the Library of Congress. The general pattern followed in the case of each book and its author has been to provide some data concerning

* Microfilm copy of complete manuscript of 253 pages, \$3.16.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-479.

the writer along with an analysis and critical review of his work, all with the intent of providing an understanding of the worth of each book in the study of Central American history. Each half-century from 1501 to 1850 is dealt with separately, with books of a similar nature classified together in each period.

The most productive half-century included in the study is the first half of the nineteenth. Here there are a number of outstanding works, along with many others individually less significant. The Compendio de la historia of Domingo Juarros, written in the last decades of the captaincy-general of Guatemala, provides a convenient summary of what colonial Central Americans knew of their own history. The Biblioteca hispano americana septentrional of José Mariano Beristain de Souza, written in Mexico at about the same time, provides a review of colonial Central American bibliography. The Bosquejo histórico and Efemérides de los hechos notables of Alejandro Marure give a remarkably accurate picture of events in the Provincias Unidas del Centro de América, the short-lived Central American union. Numerous works in the English, French, German, and Dutch languages as well as the Spanish combine to give a description of newly independent Central America from every viewpoint.

Another important period in the study is the second half of the sixteenth century, which receives more attention than any other except the one just mentioned. Here are contained the first works of history written in Central America, some of which are better known to outsiders than any of the books written later. One is the Historia verdadera de la conquista de la Nueva España, by Bernal Díaz del Castillo. Others are the Popol Vuh and the Memorial de Sololá, books which were written after the conquest by members of Guatemala's proudest native tribes, the Quiché and the Cakchiquel.

Other works treated vary from the lengthy tomes of the colonial chroniclers Fuentes y Guzmán, Vázquez, and Ximénez to a small collection of documents concerning a feud between rival cities in Costa Rica in the year 1835. A detailed table of contents provides easy reference to the individual authors in each case.

STATE GOVERNMENT AND THE ECONOMY:
MISSOURI, 1826-1860

(Publication No. 2897)*

James Neal Primm, Ph.D.
University of Missouri, 1951

The framers of Missouri's first constitution in 1820 created a strong government. With the exception of the powers denied to it by the Federal Constitution, the only limitations on the state authority were the usual guarantees of personal liberty contained in the bill of rights and provisions restraining the legislature from interfering with the institution of slavery or from chartering more than one bank of issue.

In the course of its first forty years, the state exercised its broad powers in a comprehensive manner. During periods of prosperity, measures were adopted which were intended to promote the general welfare by improving the condition of the economy. During the depression period which accompanied Missouri's admission to the Union, a relief program was instituted in an attempt to mitigate the effects of economic disaster.

Through the exercise of their chartering power, successive legislatures emphasized the role of the state as the promoter of community welfare and enterprise. Corporations were created as agents of state economic policy, under the assumption that their operations would subserve the general interest.

The Bank of the State of Missouri was chartered by the General Assembly in 1837 in an effort to provide an adequate and sound currency for the people of Missouri. During the legislative fight that preceded its creation, those legislators who were considered to be foes of the banking system generally, insisted on a maximum of ownership and control by the state in the affairs of the bank. The state was regarded by this group as the protector of the people against irresponsible banking practices.

Other corporations were chartered by the state in an effort to develop the resources of Missouri, attract immigration, and to promote prosperity.

The men who drafted Missouri's first constitution wrote into the document their conviction that the state should forever assume responsibility for the improvement of transportation facilities. Few Missourians disagreed with that positive concept of state action

* Microfilm copy of complete manuscript of 265 pages, \$3.31.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-633.

in 1820, or in the four succeeding decades. Internal improvements were to be much agitated and argued about, at times in relation to the expediency of specific projects, at other times in connection with proposed federal activity, but seldom was the state's responsibility for the promotion of better transportation called into question.

Hampered by a small population and inadequate financial resources, Missouri was not able to institute a program of internal improvements for many years. The railroad fever that swept the nation in 1836 was particularly high in Missouri for a time, but a majority in the legislature was unwilling to commit the state to a program involving a heavy expenditure of capital because of her economic weakness. Eighteen railroads were chartered in 1837, but none were built, partly because of the onset of the great panic and depression of that year.

Finally in the 1850's, the great enthusiasm for railroads that pervaded the state convinced Missouri's political leaders that the time was ripe for action. By lending her credit to the Pacific and the Hannibal and St. Joseph Railroads in 1851, Missouri embarked upon a program that was to involve the state credit to the extent of \$23,101,000 by 1860, an amount that was more than twenty-five times as large as the state's annual revenue in 1860.

The development of state economic policy during the ante-bellum period was not accompanied in Missouri by extensive philosophical attacks upon or defenses of state intervention. Expediency was the watchword in Missouri. If state action were feasible, and promised to be of direct benefit to a majority of citizens, there was little quibbling about the doctrinal correctness of the proposed policy.

THE COWPENS CAMPAIGN AND THE AMERICAN REVOLUTION

(Publication No. 2722)*

Robert Coplin Pugh, Ph. D.
University of Illinois, 1951

This study is a revision of previous narrative and interpretive accounts of the Cowpens campaign in the American Revolution — of that part of the war fought in the Carolinas between the fall of Charleston in May, 1780 and the battle of the Cowpens, January 17, 1781.

* Microfilm copy of complete manuscript of 316 pages, \$3.95.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-463.

Information now available makes possible important corrections in the older military histories and biographies, which are frequently in error, for example, with respect to dates and details of troop movements during this campaign.

The literature of the Revolution reveals a propensity to emphasize the disagreement between Sir Henry Clinton and Lord Cornwallis. This argument follows the lines that Cornwallis refused to cooperate with Clinton, and so created a rift which was reflected in the failure of British strategy in the South. Such reasoning fails to meet the facts. The initial phase of the Cowpens campaign was undertaken in compliance with the strategy planned jointly by Cornwallis and Clinton. It was American action, not the then non-existent "controversy," which deranged Clinton's project for the conquest of the South.

The sketchy and inaccurate character of maps showing the Revolution in the South is obvious when these maps are compared with each other and with contemporary descriptions. A similar criticism is applicable to most charts of the battles fought from Camden to Cowpens. The series of maps which has been drawn by the writer for this study corrects these errors and omissions. Troop movements which are neglected or incorrectly represented in previous publications have been redrawn to conform to the sources. Reference has been made in these matters to a detailed British map of the Carolinas, based on surveys conducted before 1775, and to a general map of the southern states which was used in British headquarters at New York in 1780 and 1781.

In addition to the restatements and corrections mentioned above the study presents a new emphasis upon the role of the American militia in the Revolutionary War. It develops the thesis that their service was vital to the success of the campaign of 1780-1781, a campaign which could easily have been lost by the patriots but for the action of these irregular troops. In its turn, the Cowpens campaign was a major factor in determining the outcome of the entire war, a fact which condemns the small consideration granted by military historians to the militia.

The efforts of the militia, unsupported by regular troops, destroyed Ferguson at King's Mountain, and made it impossible for Cornwallis to remain at Charlotte. However, to Daniel Morgan must go credit for the development of a type of tactics which made it possible to use American regulars and militia together. At the Cowpens, Morgan employed his militia in scouting, skirmishing, and harassing action which not only cost the English heavy casualties, but also lured them to attack over long distances.

General Greene was astute enough to pattern his tactics upon Morgan's. Though the battles of Guilford Court House and Eutaw Springs, in which Greene employed the type of disposition perfected

by Morgan, were lost by the Americans, they proved indecisive, and so costly to the British that all roads from Guilford Court House led inevitably to the surrender at Yorktown.

By drawing troops from the North, to be absorbed into the casualty-ridden British army in the South, by enabling the patriots to continue resistance even though they lost battles, and by giving Cornwallis no alternative but the defense of a strong post such as Yorktown, the tactics of the southern campaign contributed far more than is generally recognized to the successful conclusion of the War for Independence.

THE SCIENTIFIC MIXED WITH THE POLITICAL:
JOHN QUINCY, BROOKS, AND HENRY ADAMS

(Publication No. 2788)*

Nathan Reingold, Ph. D.
University of Pennsylvania, 1951

In "The Heritage of Henry Adams" Brooks Adams defined the common denominator of Adams mental activity as a concern with the relation of knowledge to right action. The thesis was devised to explain a similarity between John Quincy and Henry Adams. The continuity of thought resulted in different products owing to changes in the intellectual climate.

Brooks Adams, by inference, referred to the use of science as a universal analogy outside of strictly scientific disciplines. This use occurs as a convenient metaphor, as a commitment to a specific methodology, or as a belief in an elaborate cosmology. Of course, the universal analogy did not originate in the modern period. But the success of Newton and the general advance of science gave the universal analogy a prestige few men of the eighteenth and nineteenth centuries could escape. As a consequence, the belief grew that science would ultimately disclose social laws which would be the basis for a civilization paralleling "the harmony of the stars."

When Henry and Brooks Adams looked back at their grandfather's career, strong nostalgia could not conceal the serious cleavage between the views of the two generations. Neither Brooks nor Henry Adams could seriously believe in the "Democratic Dogma," another name for the idea of progress. As Brooks Adams was quick to note, the shift from John Quincy Adams' "science" to Henry Adams' "science" was a measure of a momentous intellectual

* Microfilm copy of complete manuscript of 152 pages, \$1.90.

Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A 51-528.

change. A comparison of the different ways in which John Quincy, Brooks, and Henry Adams defined science illuminates the nature of the supposed family evolution. In the case of John Quincy Adams we are dealing with a conventional view of the eighteenth and nineteenth centuries. Science was systematized common sense; it was a method by which the mind obtained exact information about the material world. The information had a definite utilitarian purpose contributing to the improvement of humanity. Supporting this belief was the view that the Deity was the source of order in nature and the guarantee of the ultimate triumph of moral values.

Brooks Adams' use of the term "science" is similar to his grandfather's in that it is not limited to disciplines like physics and chemistry but includes every attempt of man's will to impose order and form on the universe. It was not difficult for him to include history, economics, law, and public administration within a Newtonian framework. However, there is a decided difference in mood. In the absence of a benevolent Deity or an orderly nature Brooks Adams could not confidently talk of progress but only of change. As a result, he pays greater attention to the analogies with physical theory; his grandfather could take the analogies for granted and concentrate on values. When his observations indicated that change was decay, Brooks Adams used the same scientific thought John Quincy leaned upon to formulate theories that his grandfather would "reject with horror." The interesting thing about the work of both Brooks and Henry Adams is their complete reversal of the idea of progress. They postulate a chaotic world in which human actions are futile, not because the world is rigidly determined, but because there is no sensible determination. Paradoxically, both brothers arrive at this conclusion on the basis of scientific theories and evidence which assume orderly relationships between the divers aspects of nature. After the turn of the century Brooks Adams briefly believed that minds trained to generalize from scientific evidence could prevent painful adjustments to reality. By 1919 he was certain that all attempts to improve mankind by the application of intelligence were bound to fail. The world simply did not run according to any human plan.

Henry Adams started out from a similar nineteenth century viewpoint as his brother and also ended up on a note of pessimism. However, he was not content with merely accepting the evidence of science that the world was chaos; Henry Adams perceived that such a view required a redefinition of science. From contemporary writings he took up the idea that science was a manipulation of symbols by which man achieved a comforting illusion. The view was an exaggeration of the new doctrines; his later works are a mythological explanation of the decay of nineteenth century liberalism.

John Quincy Adams used science as a handy tool to achieve his ends. Brooks and Henry, on the other hand, feel that any worthwhile goal is largely unattainable because of the essential character of the universe. The origin of this view was the history of the years 1865-1900 in which man spectacularly applied intelligence to the control of matter. These years were also notable for a vast proliferation of social theories in the form of scientific hypotheses. Science was at the same time the cause of Henry and Brooks' disenchantment and the buttress of their position. John Quincy Adams made history; the best that Henry and Brooks Adams could do was write philosophies of history. What was once belief wedded to action has become belief incapable of any exertion.

**THE EARLY POLITICAL CAREER OF
MARTIN VAN BUREN, 1782-1828**

(Publication No. 2852)*

Robert Vincent Remini, Ph.D.
Columbia University, 1951

During the past number of years Martin Van Buren has been slowly gaining a reputation among historians as a liberal statesman of rare intellectual acumen. Heretofore, he had been dismissed as a wily, intriguing politician, who was non-committal about virtually every important national issue and who unscrupulously fought his way to the presidency.

Van Buren's superior knowledge of the science of politics is not to be denied. But that this generalization constitutes the essential feature of his character or explains the unprecedented success which attended his career is completely false.

Perhaps the early years he spent in New York and Washington provide the most satisfactory materials to understand this many sided man. Therefore, this study treats of those years from his birth in 1782 to his appointment as Secretary of State by Andrew Jackson in 1829. His activities in New York as a student, lawyer and politician, and later in Washington as a Senator are presented in detail. Included are examinations of his determined efforts to pass the "Tariff of Abominations," his prominent role in organizing the Democratic party and his decisive influence in the presidential elections of 1816, 1824, and 1828.

* Microfilm copy of complete manuscript of 723 pages, \$9.04.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-589.

Although Van Buren's tremendous love of party colored his behavior and thinking in nearly every phase of his early life, nevertheless he developed a clear, concise and reasonably consistent philosophy of government. He liked to consider himself a true disciple of the Jeffersonian school. He was an outspoken champion of the rights of the States. He opposed federally sponsored internal improvements, and gave definite indications that he favored a limited State-regulated banking system.

He was always a devoted adherent of the federal union. To his way of thinking there was no substitute for a caucus-controlled party representing all the great sections of the country. The men he would place in charge of the party as well as the government were those equipped to "read the signs of the times" and react promptly to the current of popular opinion. He feared the courts, but more especially he feared the unreasoning devotion of the American people for the judges who sat upon them. He preferred an elected judiciary which would be as responsible to the wishes of the masses as were the other two branches of the government.

A good deal of Martin Van Buren's political ideology was borrowed from other men. But under his direction much of it was adopted by the Democratic party. There can be no doubt that his services to his country and party have been considerable.

A STUDY OF THE INDUSTRIAL WORKER IN PENNSYLVANIA; 1800 TO 1840

(Publication No. 2863)*

William Arnold Sullivan, Ph. D.
Columbia University, 1951

Labor as an active and organized force is becoming increasingly more important in shaping the economic, political and social life of the nation. In order to adequately appreciate this increased prestige which the wage earners of America enjoy today, it is necessary to study the labor movement from its earliest beginnings.

The years from 1800 to 1840 form a convenient unit for a study of the situation of the industrial worker who has been a dominant influence in the American labor movement. During these years the status of the wage earner was undergoing a subtle but profound transformation. The introduction of steam driven machinery and the growth of the factory system menaced the preeminent position

* Microfilm copy of complete manuscript of 332 pages, \$4.15.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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of the skilled artisan, and brought unskilled hands, and women and child wage earners into direct competition with him. These same decades witnessed, too, the emergence of labor as an articulate force in the economic and social life of the nation.

Pennsylvania, during these same years, provides an excellent locale for the study of the labor movement. Probably no other state could match its wealth in natural resources. In addition, this state possessed in an enviable degree the necessary concentration of capital and labor without which the factory system could not have developed. And it is the development of the factory system which brings about the cleavage between capital and labor which makes the appearance of the labor movement almost inevitable.

Some of the earliest struggles between capital and labor took place in Pennsylvania. It was here that labor first organized, and it was in this state that the capitalists perfected their weapons for resisting the aggressive demands of organized labor. The cordwainers organized in 1792 and carried their demands for higher wages until 1805 when their employers hailed them into court and successfully prosecuted them on charges of criminal conspiracy. In the first quarter of the nineteenth century the labor movement in Pennsylvania was dominated by the skilled wage earners such as the cordwainers, the carpenters and the typographical workers.

Throughout the Jackson era not only the skilled but the unskilled were to play an increasingly more important part in the struggles of labor for a more equitable share of the wealth. Moreover, the growth of the labor movement was evidenced not only by the tremendous increase in numbers among the varying trade unions, but also by the growth of such central organizations of trade unions as The Mechanic's Union of Trade Associations of Philadelphia, The Philadelphia Trades' Union and The National Trades' Union. In addition, the various trades were beginning to organize on a national basis. The cordwainers, the typographers, the carpenters and even the weavers organized national unions to establish a uniform policy in their respective trades throughout the United States.

Probably no aspect of the labor movement has been more widely misunderstood than the political activity of organized labor during the Jackson era. During the early years of Jackson's administration political parties bearing the label of Working Men's parties appeared in many of the cities throughout the United States. Philadelphia was the home of the first "Working Men's Party." And very shortly similar parties were in existence in Pittsburgh, Lancaster, Harrisburg and other cities throughout Pennsylvania. Students of labor and politics have, in the past, been prone to accept these parties bearing the Working Men's label at their face value. But a more critical examination of these organizations reveals that their only association with the workingmen was in the name.

The appearance of these organizations bearing the label "Working Men's Party" was indicative of the growing importance of labor as a political force. And the labor movement of today owes much to the courageous and sometimes futile efforts of the Pennsylvania wage earners. They were the first to organize for collective action. They were the first to formulate a political program, radical in its day but now accepted as a minimum basis of labor's demands in a capitalist society. They were the first to feel the crushing effects of unsympathetic court decisions and the stinging criticisms of a hostile press. These wage earners were convinced that they were involved in a struggle to preserve democracy. And neither adverse court decisions nor unsuccessful strike actions shatter their faith in the creed which Thomas Jefferson had written into the Declaration of Independence.

**SWIFT AND COMPANY: THE DEVELOPMENT OF THE
PACKING INDUSTRY 1875 TO 1912**

(Publication No. 2747)*

Louis Unfer, Ph.D.
University of Illinois, 1951

The packing industry developed in the American Colonies as soon as a local surplus of meat animals was assured. Cattle and hogs thrived under frontier conditions. As the settlers advanced across the mountains after the Indian menace had been removed in the Ohio Valley, it became the great livestock producing region of the Nation. Cincinnati was the pork-packing center of the world. Later Chicago and St. Louis took over the leadership and shared it until the Civil War. During the War Chicago became the leader and was able to retain it when refrigeration revolutionized the industry. The development of the great trans-continental railroads encouraged cattle ranching on the cheap grazing lands of the West. At first the eastern markets were supplied with fresh beef by the shipment of live cattle to these centers where the animals were slaughtered locally.

Among the energetic young men, who established the great packing industry in Chicago, was a New England Yankee, Gustavus Franklin Swift. Mr. Swift located in Chicago, in 1874, as a cattle buyer. He became impressed with the basic idea of slaughtering cattle in Chicago and shipping the beef to the East to avoid the payment of freight on the inedible portions of the animals. As he saw it, it was

* Microfilm copy of complete manuscript of 203 pages, \$2.54.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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a question of paying freight on 45 per cent of waste to get 55 per cent of the available product to market.

Mr. Swift was the leader in the development of the dressed-beef trade. However, other Chicago packers, especially Philip D. Armour and Nelson Morris, soon entered the field as active competitors. The Chicago packers were the first to utilize fully the benefits of the newer methods of production and distribution of their products. They were also the first to establish branch slaughtering plants in the great livestock producing areas in the West. As the dressed-beef trade increased, the shipments of live animals to the East decreased correspondingly. With the development of the domestic trade in dressed beef came the expansion of it into foreign countries until the Chicago packers had established an extensive trade in the leading markets of the world.

The centralization of the industry under the control of a small group of influential and wealthy packer families brought charges of monopoly and prosecution by the Government, which contended that a beef trust had been formed. A number of indictments were charged against the alleged packer combinations and several suits were instituted against them. In these suits the Government contended that combinations had been formed in restraint of trade. Although the packers were not convicted of these charges, they consented to dissolve the National Packing Company which was considered to be the beef trust. In the meantime a popular outcry was raised against the alleged lack of sanitation in the packing plants and a commission was appointed by the President to conduct an investigation. The commission reported conditions unsatisfactory and recommended drastic changes. The packers were quick to conform to the Government's regulations and public confidence was restored in the purity of their products.

The question of monopoly, which was the subject of the ten-year battle between the Government and the packers, came to a halt with the acquittal of the packers and the dissolution of the National Packing Company in 1912. Although later investigations were made and additional congressional legislation was enacted which was intended to clarify the law, a discussion of this is beyond the scope of this work. The importance of these investigations, from the point of view of the packing industry's public relations, has been to present to the public the fundamental operations of the business of the industry. In this respect, Mr. Harold H. Swift, Chairman of the Board of Directors of Swift and Company, has stated that "Pioneers in industrial history should not be judged by a social consciousness of many decades later."

**THE NEW HAMPSHIRE ELECTRIC COOPERATIVE:
ITS HISTORY AND INFLUENCE ON RURAL LIVING 1935-1950**

(Publication No. 2867)*

Philmore Burlon Wass, Ph.D.
Columbia University, 1951

The purpose of this dissertation was three-fold:

1. To write a history of the New Hampshire Electric Cooperative.
2. To learn how electricity has influenced rural living in New Hampshire.
3. To gather information which may help people in New Hampshire's hill country to gain a better understanding of their social, economic and educational problems.

Because rural New Hampshire was settled early in the nation's history it has been forced to make continuous adjustments to the rapid changes in the expanding national economy. Finally, following the Civil War the hill country seemed threatened with general depopulation. However, the arrival of the automobile, rural free delivery, telephones, radio, and electric power began a long process of ameliorating the lot of the hill-country farmers. Electric power, however, proved hard to get because in many cases the companies' rates were prohibitively expensive. Finally after many years of effort, Franklin Delano Roosevelt set up the Rural Electrification Administration.

In the thirties, William Neal, Master of the New Hampshire State Grange, became disturbed over the rural electrification pattern which was being followed by the private utilities. He decided to invite REA officials to New Hampshire. As a result, the New Hampshire Electric Cooperative was incorporated July 19, 1939. At the present time, more than 5,000 rural homes are being served with electricity which otherwise might have been without it.

The material for the history of the Cooperative was gained largely from newspapers and interviews with the men involved in the movement. The data concerning the effects of electrification was gathered through personal interviews with 142 people selected on a random-sample basis.

Significant information was gained on several questions. The first of these was to determine what influence, if any, the availability of electricity might have in restoring the populations in small

* Microfilm copy of complete manuscript of 222 pages, \$2.78.
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towns. The survey revealed that 39 percent or 56 of the 142 permanent Cooperative members who were interviewed are newcomers to rural New Hampshire and 31 percent are newcomers to the state. Sixty-eight percent of the 56 stated that they would not have settled in such remote locations without electricity. It can be stated as a fact that the extension of power lines by the Cooperative has been a great influence in the partial repopulating of rural New Hampshire.

Many electrical appliances were in use among Cooperative members; all had electric lights; 186 radio sets were owned by the 142 consumers; 87 percent had flatirons; 69 percent had washing machines; 63 percent had electric refrigerators; 48 percent had water pumps; and 26 percent had bathrooms.

Members revealed little interest in the Cooperative as a democratic business organization. One hundred and twenty out of 130 answered, "Yes," when asked if they were aware that they had a right to vote on policies at the annual meeting but only six had ever attended such a meeting.

The Cooperative has helped to rebuild tax resources. Twenty-two percent of the sample reported definite increases in the assessed valuations of their property. In addition to this, all property took a decisive jump in price when electricity became available.

The Rural Electrification Administration has had little or no political influence in New Hampshire. The survey indicated that few votes were gained by the Democratic party because of the money spent on rural electrification.

With the extension of the Cooperative lines many devices of modern living became available for the people of the hill country. The lessening of labor required to maintain a home and to earn a living plus the greater hours of freedom and leisure have made life in the hill country alluring once more.

ST. LOUIS AND CITIES WEST, 1820-1880 A STUDY IN HISTORY AND GEOGRAPHY

(Publication No. 2786)*

Eugene Tate Wells, Ph. D.
University of Kansas, 1951

The purpose of this study was to investigate the factors of city development in the central Trans-Mississippi West for the period 1820 to 1880. Emphasis was placed on transportation, economics,

* Microfilm copy of complete manuscript of 624 pages, \$7.80.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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and geographical location. Yet none of these factors were sole determinants for only man through a wide range of interests makes possible the development of metropolitan areas.

The inhabitants of the region continuously expressed ideas concerning city location, function, factors of growth, and significance to society. Newspapers and periodicals provided the principal source of information for the ideas of the citizens as well as the factual side of development. These were supplemented by public documents, contemporary pamphlets, and books. Few manuscripts were found that bore upon the problem.

St. Louis in 1835 was beginning to compete with Cincinnati and other eastern cities for commercial control of the Mississippi valley. In 1845 St. Louis was without a serious rival in the central valley although lower Missouri river towns were attempting to secure the trade of the plains and Southwest. A decade later Chicago and Memphis were making challenges for control of transportation and commerce in the Trans-Mississippi region. By 1870 the position of the leading cities of the area might be described as a diamond with St. Louis in the center: Cincinnati, the east point; Chicago, the north point; Memphis, the south point, and Kansas City, the west point.

St. Louis, because of the inherent belief in water transportation, faith in geographical location, and the conservative nature of the commercial and financial leaders, was unable to meet the demands of a rapidly expanding business world and failed to recognize the significance of new technological developments; thus, she lost control of territory that might have been a tributary area. In contrast, Kansas City's inhabitants, newspapers, and local interests united behind rail rather than water transportation, appreciated the geographical advantages, and had confidence in rewards from their enterprise; thus, the city was able to expand against active competition.

City development is still an open process. New technology, especially in gas and oil, and the emphasis on circumpolar air transportation have given new significance to the "heart of America."

RELIGION IN ACTION: A HISTORY OF THE
SALVATION ARMY IN THE UNITED STATES

(Publication No. 2868)*

Herbert Andrew Wisbey, Jr., Ph.D.
Columbia University, 1951

This study traces in narrative form the seventy-one year history of the Salvation Army in this country and indicates the unique contributions of the organization to the religious and social history of the United States.

The Salvation Army, founded in London by William Booth in 1865, was officially introduced into the United States in 1880. The first Commissioner, George Scott Railton, with a pioneer party of seven "lassies" laid the foundations for the organization during his brief administration from 1880 to 1881. He was succeeded by Major Thomas E. Moore, who after three and a half years in America led a secession from the international Army. Commissioner Frank Smith (1884-1887) regained the ground lost by the Moore schism and led a continued advance. This period, sometimes called "the brickbat era," was one of persecution in which the Army suffered assault by roughs and arrests by police.

Gradually the Salvation Army won the respect and support of many prominent Americans, particularly during the administration of Maud and Ballington Booth (1887-1896). When these two leaders resigned from the Salvation Army to found another organization, the Volunteers of America, Consul Emma Booth-Tucker and her husband, Frederick de L. Booth-Tucker, assumed the command.

From 1904 until 1934, the American branch of the Salvation Army was under the command of Evangeline Cory Booth. During this period the Army expanded its social program, began its disaster relief work with the San Francisco 'quake and fire in 1906, and won the acclaim of the American public with its work overseas in France during World War I. When Evangeline Booth left the United States as General of the international Salvation Army in 1934, a new era of policy rather than personality was inaugurated. The Salvation Army in the United States today is a triune organization — mission, church, and social relief organization — all in one.

The Salvation Army's most notable contribution in the United States was its work in the city slums, to which it carried its message of a dynamic personal religion. Its novel and sometimes

* Microfilm copy of complete manuscript of 436 pages, \$5.45.
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bizarre methods were effective in touching a class of people that orthodox churches failed to reach. Furthermore, they served to dramatize and bring to public attention the problems of the lowest social classes in the poorest sections of the rapidly growing cities. The Salvation Army's ministry to the poor was not confined to preaching alone. Men and women were helped to rehabilitate themselves and the comprehensive system of Salvation Army social services in the United States gradually evolved.

International in its scope, the Salvation Army has been a powerful exponent of the universal brotherhood of man without regard to sex, race, color, nationality, or social class. From the beginning women shared equal responsibility in the organization with men. The Army showed a sincere concern for the position of the Negro and attacked racial discrimination. Membership in an international organization has helped to make Salvationists international-minded, and rank and file as well as leaders have consistently supported such international political organizations.

The Salvation Army in the United States faces the future with a determination to adapt itself to changing times in order to meet effectively modern problems and needs. It indicates its willingness to use modern scientific methods and to meet the highest professional standards, but it maintains that its greatest service lies in its efforts to help the individual discover his relationship with God and the Universe.

HORTICULTURE

THE GERMINABILITY OF TOMATO SEED IN RELATION TO FRUIT MATURITY

(Publication No. 2724)*

Mahmoud Abdel Raouf Tayel, Ph.D.
University of Illinois, 1951

The present study was an attempt to determine the germinability of tomato seed at various stages of fruit maturation and ripeness under different environmental conditions. Experiments were conducted in both the greenhouse and the field with the Garden State variety. The data presented with their implications may be summarized as follows:

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Tomato seed were found to be capable of germination from 30 to 35 days after the time of anthesis. Germinability and seed size increase until the fruit begin to develop color after which the percent germination decreases with the time the seed remain in the fruit. The time required for tomato fruits to reach the turning stage varied from 39 to 52 days depending on environmental conditions. The mean times required for field and winter greenhouse tomatoes to reach the turning stage were 41.5 and 47.2 days, respectively.

Sprouting of seed in ripe tomato fruits was found to be an important factor affecting germination. Sprouting was observed 12 days after the turning stage and varied with both moisture and temperature. The data indicate that best seed quality can be obtained where fruits ripen under dry and cool conditions.

Ripening fruits were found to emanate gases that inhibit seed germination except at a very low concentration at which it was stimulated. The production of gases reached a peak about 4 days after the turning stage and then declined. They could easily account for the fact that seed do not sprout in fruits before the time of full color development.

LANGUAGE

THE USE OF DOXA IN GREEK LITERATURE WITH SPECIAL REFERENCE TO THE NEW TESTAMENT

(Publication No. 2871)*

Everett Falconer Harrison, Ph.D.
University of Pennsylvania, 1950

By the examination of leading authors from Homer through the New Testament, an effort has been made to determine the meaning of *doxa* as exactly as possible.

The first meaning to emerge is expectation, which is closely allied to thought or opinion. Related to this common force of the word is the meaning belief or conviction. In a more specialized use, *doxa* came to denote a philosophical position or tenet. Among the poets, orators, and historians the word is frequently found in the sense of reputation, fame, or glory. The specific connotation, whether favorable or otherwise, is often indicated by adjectives.

* Microfilm copy of complete manuscript of 252 pages, \$3.15. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-607.

Of lesser importance is the meaning appearance or vision. Occasionally the word is best translated impression.

In the Septuagint the meaning opinion practically disappears. The word continues to be used in the sense of reputation and honor. But the new feature is the appearance of a cluster of meanings not found in classical Greek. For the most part, these are due to the fact that doxa is employed to render the Hebrew kabod, a word which denotes weight or importance and which came to be used for the expression of many additional ideas. These include riches, honor, praise, majesty, beauty, might, light, and even soul or person.

Since the notion of importance or reputation was an acknowledged part of the content of doxa, it could be readily used for kabod in situations calling for such a sense. Due to its association with kabod, doxa seems to have acquired from the Hebrew word as a verbal fringe certain connotations which were inherent in it but which were not originally a part of the content of doxa.

It is of considerable interest to find that doxa is used for the glory of God in the Septuagint, sometimes meaning majesty in the abstract sense but also the display of light by which the God of Israel is ever and again depicted in the Hebrew Scriptures as revealing Himself to men.

The conclusion is reached that this concept of light in connection with doxa is neither a part of its early Greek significance which somehow failed to appear in the literature up to this point nor is it an importation from Iranian or other religious sources emphasizing the element of light, but is rather a native Semitic development which became imposed on doxa through the exigencies of translation.

In the Apocrypha and Pseudepigrapha the usage is similar to that of the Old Testament, with the addition that doxa becomes used as a title for God. Philo uses it for the intermediary powers through which God deals with the creation.

The use of doxa as a term for the eschatological state of purified souls becomes prominent in the Hermetica and in the Mystery Religion literature.

New Testament usage is patterned closely after that of the Septuagint. The meaning opinion does not occur. Some place is found for doxa in the sense of honor and also of praise. As applied to God, doxa connotes either majesty, as a combination of excellence and might, or it bears the sense of light in connection with a disclosure of Himself. The word is also applied to Christ as indicative of his worth and divine status. Christians have a share in the doxa: in the present time as a moral and spiritual conformation to Christ, and in the future as an expression of participation in completed salvation and heavenly bliss.

In the final chapter, *doxa* is compared with certain other Greek terms which sustain a measure of affinity to it but from which it must be differentiated.

ATTITUDES AND CULTURAL PATTERNS IN SPANISH PROVERBS

(Publication No. 2851)*

Joseph Ballard Raymond, Ph.D.
Columbia University, 1951

This is a study of Spanish attitudes as expressed in Spanish proverbs. Many have felt that the enormous store of Spanish proverbs should afford great insight into the Spanish way of life. Yet, to the writer's knowledge, no one has attempted systematically to demonstrate or to reject the validity of this assumption.

The study involves the following major steps:

First, proverbs are placed in a social and psychological perspective, and a method for content analysis of proverbs is described.

In the second part, a qualitative check is made, comparing attitudes and characteristics ascribed by responsible writers to the Spanish people with aspects stressed in Spanish proverbs. An analysis of major pervasive themes in the content of José María Sbarbi's *Gran diccionario* (containing some 20,000 Spanish proverbs) is made, setting up tentative categories: "Body and Physical Self," "Status of Individual," "Relationships," and "Authority." Themes within these categories are checked with some 250 proverbs from one literary source, *Don Quixote*.

Using these categories, a quantitative check is effected by random sampling from two published collections of alphabetized proverbs: each twentieth item in Gonzalo Correas's *Vocabulario* (containing some 20,000 proverbs) and each fifteenth item in Francisco Rodríguez Marín's *12.600 refrancs más*. Total content of these proverbs is compared with observations made by descriptive writers, to determine to what extent proverbs coincided or conflicted with prevalent folk notions and traits.

According to content analysis and random sampling, the overwhelming majority of proverbs indicate cultural patterns attributed to the Spanish people. Convergent materials (alphabetized proverbs, random counting, proverbs in literary context, and

* Microfilm copy of complete manuscript of 261 pages, \$3.26.
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impressionistic descriptions of the Spanish people) suggest a high degree of validation.

Spanish proverbs appear to (1) stress those images the people are alleged to idealize, or (2) describe physical reality and suggest means of adapting to it, or (3) disparage, or in fewer cases, conform to authority, or (4) disparage or reject given groups, or (5) delineate features of interpersonal relationships.

More specifically, Spanish proverbs show an aspiration to sobriety, moderation, dignity, prudence and discretion. The proverbs often deal with laziness, greed, revenge, hypocrisy and envy. They stress stern obedience for child-training, and reflect strong interests in food, drink, and welfare of the body.

Among other predominant themes in the proverbs are: regionalism (largely antagonistic), attacks upon priests, monks, Jews, and public officials, faith in Divine guidance, and a preference for traditional practices — as compared with cultural innovations. Obscene and pornographic proverbs, judging from polite patterns, are plentiful.

All of these "proverbial" interests are emphasized in the descriptive literature. In one area, proverbs suggest a marked interest in the optical contact with reality — hinting that the eyes in childhood may have been the chief exploratory organ. This aspect did not emerge from the descriptive literature.

In three appendixes, an historical sketch of Spanish proverb collections and studies from the fifteenth century is made; all random sampling classifications are given as support to the thesis. Finally, specific suggestions are given for using proverbs in teaching Spanish language and culture.

LITERATURE

SHAKESPEARE'S TREATMENT OF THE SOCIAL POSITION OF WOMEN

(Publication No. 2793)*

Betty Bandel, Ph. D.
Columbia University, 1951

After reviewing the history of women in England up to 1600 and the literary treatment accorded women characters by Shakespeare's

* Microfilm copy of complete manuscript of 326 pages, \$4.08.
Enlargements 6" x 8", 10¢ per page. Library of Congress
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predecessors, this study examines Shakespeare's treatment of women characters in all their social relationships.

Between 600 and 1600 there was in England a very gradual decline in the importance of the home as an economic and political unit. Shakespeare was standing on the threshold of a period which was to remove industry from the home and thus place the mass of women in the lowest economic and political position they have ever occupied in English history. Despite her growing idleness, however, the typical Englishwoman of Shakespeare's day was still a person with a large, economically important job to do in the home, free to share in Tudor religious and educational and literary adventures, if not in Tudor travels and explorations and wars.

The development of the "courtly love" concept in literature provided for women a new and dramatic role, as their economic, political, and religious jobs shrank in scope. It emphasized their sex role rather than their larger job as human beings, however, and this emphasis upon women as women is apparent both in literary and historic accounts of the later Middle Ages and the Renaissance. Before Shakespeare's day no significant story was written in England which does what Sophocles' *Antigone* does — makes the protagonist a woman working out a problem other than a love problem, and requires her to work it out by purely human means. Pre-conquest historians mention outstanding women like the Mercian ruler Aethelflaed casually; post-conquest historians generally describe such women as being man-like.

When one assesses Shakespeare's treatment of women characters — first in terms of the individual development which his plays imply that they may have, then in terms of the development for women which a few of his plays specifically dramatize, and finally in terms of the contribution which women make to the rest of society — it becomes apparent that, although Shakespeare adopts the attitude of writers of his age in emphasizing the sex role of women, the thing that is distinctive about his treatment of the subject is that he uses that emphasis to add richness and variety, as well as realism, to his portrayal of all the other roles that women might play. He sees the sex role, through the social institution of marriage, as opening up for women a variety of opportunities for rich, rewarding activities. Shakespeare's women play a decisive part in establishing workable human relationships; they are mothers, friends, fellow workers, as well as lovers. In showing woman as capable of all these activities and feelings, Shakespeare is being faithful, not to the literature, but to the life of his times.

The few women whose actual development Shakespeare chooses to dramatize — Adriana, Isabella, Lady Macbeth, Beatrice, and Katherine the Shrew — are all deficient, at the beginning of their stories, in the same thing: full comprehension of the other person's

point of view. Although Shakespeare pictures women as capable of many kinds of development and many kinds of activity, in the world he knew women enjoyed such development primarily because of their direct dealings with other human beings — whether in the home, the shop, or the court. Apparently Shakespeare thought women most likely to make a maximum contribution to society if they were possessed of that acute understanding of the other person's point of view which is essential in maintaining the most satisfactory human relationships.

**THE CONCEPT OF BUSINESS ETHICS REFLECTED IN
AMERICA'S LITERARY AWAKENING, 1820-1835**

(Publication No. 2753)*

Lawrence David Brennan, Ph.D.
New York University, 1951

The purpose of this thesis is one of determining the concept of business ethics held by American men of letters in the period 1820-1835. With the mission of contributing to a fuller understanding of American intellectual history, the investigator presented some conclusions on aesthetic, economic, and moral relationships in this period of literary awakening.

The impact of business activity upon the American literary mind has been a subject of some comment by historians and critics of American life during the present century. With a few very notable exceptions, however, these comments have not been built upon any scientific investigations into the status of these aesthetic-economic relationships. The 1820-1835 period in particular has been given a variety of conflicting interpretations in this regard. A better appreciation of this period is basic to an understanding of the century, for it is epochal in the development of both our literary art and the development of 19th Century industrial and finance capitalism.

There were two main phases of this investigation. First, a comparison was made between the view of the morality of this period held by the modern historian and the view of the morality of the period found in 1820-1835 literary expression. Second, the reflections found in the literature of the period were evaluated in terms of the biographical and environmental circumstances of the authors and editors of the age to determine independence and sincerity of judgment.

* Microfilm copy of complete manuscript of 687 pages, \$8.59.
Enlargements 6" x 8", 10¢ per page. Library of Congress
Card Number Mic A51-493.

The research was not confined to any single species of writing but included novels, tales, essays, poetry, drama, and oratory. The writers examined were not only the main literary figures such as James Fenimore Cooper or William Cullen Bryant but also included such minor figures as Asa Greene, Sarah Josepha Hale and the anonymous periodical essayists of the age.

Business morality was given a very large representation in the literature of the period and all of the crucial moral areas which the modern critic sees in the period were fully and openly discussed by the various 1820-1835 period writers. Instead of being a topic neglected in a conspiracy of silence or buried under "bourgeois optimism," the economic morality of the age was discussed in a most positive and realistic fashion. However, there were two opposed views on business morality taken by the writers of the age. A strongly reactionary group supported certain business activities which are deemed unconscionable by Twentieth Century historians. In very strong opposition, stood a number of prominent writers who identified accurately all the economic vices of the age and called upon their generation for an improvement of economic moral standards. So vehement and realistic, in fact, was the advice offered by men like Cooper, Bryant, Paulding, Flint, and Cox that nowhere in the age was there to be found better guidance in economic morality than in their writings.

Literary sources were found to afford excellent insight into the fabric of business at the time but the inchoate nature of this literary expression made impossible the fixing of any special values to any literary form. Cooper's didactic novels were an especially good source of independent criticism from the standpoint of quality, but the periodical essay was by far the most voluminous commentary on business ethics.

It is recommended that certain 1820-1835 period writers be given greater credit for their constructive guidance in this period, that a similar exploration be made in the New England renaissance, and that greater use be made of literary sources by business historians.

RICHARD DUKE'S SATIRES ON THE POPISSH PLOT

(Publication No. 2700)*

Stanley A. Clayes, Ph.D.
University of Pennsylvania, 1951

This dissertation is an edition of Richard Duke's satires on the Popish Plot, and it includes a chapter sketching Richard Duke's career and another on Popish Plot satires. Born the son of a humble but prosperous London scrivener, Richard Duke (1658-1711) rose to a modest fame as a wit among the fellows at Cambridge and among the literary men in London. Until he became a divine in 1688, he divided his time between London and Trinity College, Cambridge, to which he had been elected from Westminster in 1675. As a frequent contributor to Dryden's miscellanies and translations, as a wit at Cambridge and probably at Court, as the friend of Otway and Prior and many other literary figures of his age, and as a man of his age — poet, satirist, translator and divine — Richard Duke's career is interesting; but in former accounts of his life and writing, what is most interesting, his Tory satire, was most often ignored.

Published in 1679 and 1680, probably by the Tory publisher Nathanael Thompson, Duke's broadsides were the first Tory verse satires of any merit in the controversy between Whig and Tory publishers on the issue of the Popish Plot. By the time Absalom and Achitophel was published late in 1681, a Tory tradition of lampooning Titus Oates and Shaftesbury had been established by the pamphleteers and broadside satirists, and although Absalom and Achitophel is so far superior to that tradition as to belong in a different literary class, the satire that preceded it on the same subject still has a claim of its own to our curiosity. This verse satire, chiefly invective and low burlesque in technique, exhibits a bawdy, robust humor and careless composition that clearly mark most of the broadside ballads and satires of Restoration times, but we may judge from the number of pieces on the Popish Plot that have survived on broadsides and in miscellanies that the subject was extremely popular from 1678 until 1685.

The four satires by Richard Duke edited in this dissertation are distinctive and worth preserving in a modern edition for two reasons. A Panegyrick upon Oates, An Epithalamium upon the Marriage of Capt. William Bedloe, and Funeral Tears upon the Death of Capt. William Bedloe have an artistic unity that makes

* Microfilm copy of complete manuscript of 161 pages, \$2.01. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-441.

them a worthwhile addition to the small volume of Hudibrastic satire we have in modern editions. On the other hand, because its technique of satire is unusual, A Satyr against Satyrs has an historical interest for literary men. It was never published again after the first edition, whereas the three Hudibrastic satires were printed first on broadsides then in various miscellanies. The texts edited here are all from the first broadside editions, and textual notes record variants from all other editions that are known.

THE ADVERSARIES OF GIOSUE CARDUCCI

(Publication No. 2806)*

Angelo Michael De Luca, Ph.D.
Columbia University, 1951

Throughout his life Giosue Carducci rebelled against forces which, according to his severe classical standards, tended to weaken the moral, aesthetic, and political fibres of his country. Such a man was bound to attract considerable opposition. This study attempts to trace and analyze the history of anti-Carduccianism from 1854, when Carducci initiated his campaign against Italian romanticism, to the period immediately preceding the First World War, when the posthumous polemic over the values of Carducci's work was fought. The presentation of the material follows a simple chronological arrangement.

The first chapter records the antagonism of the lexicographer, Pietro Fanfani, and several Florentine journals to Carducci's Rime and the three antiromantic ventures of Carducci and the Amici Pedanti — the Diceria, the Guinta alla derrata, and the Poliziano. By the middle of 1859 Carducci and his Florentine enemies were at peace again. In 1860 the poet went to the University of Bologna as professor of Italian literature and enjoyed about six years of quiet dedication to study. The calm broke due to: 1) the composition of the positivistic Hymn to Satan, 2) his agitation in favor of Mazzinian republicanism.

Chapter two deals with the polemic provoked by the Hymn to Satan. The Church vehemently denounced the hymn's anti-clericalism. Quirico Filopanti belittled it as an "intellectual orgy." Some questioned the logic of employing the traditional symbol of evil as a symbol of progress. Although emphasis has been placed on the

* Microfilm copy of complete manuscript of 349 pages, \$4.36. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-543.

opposition to the hymn in 1869 and 1875, other expressions against it up to 1880 have been noted.

Chapter three is devoted to the political hostility against Carducci between 1866 and 1880. In this period the Masons, the Neapolitan monarchists (Angelo Camillo De Meis, Francesco Fiorentino, and Vittorio Imbriani), and the Ministry of Education condemned him for his republican pronouncements; Eduardo Arbib accused him of unpatriotic behavior; and Baron Franco Mistrali slandered him in the press. Certain political antagonisms of these years have been excluded from this chapter since they are linked with the literary opposition of the period in question.

These are examined in chapter four on the literary opponents between 1869 and 1880. This is Carducci's period of greatest literary stress. Giuseppe Guerzoni and Bernardino Zendrini disparaged his *Nuove Poesie*; certain moralists criticized his poetry as pornographic; a host of critics censured him for the classical meters of the *Odi barbare*; others objected to some odes on ideological grounds. Nevertheless Carducci's prestige grew, while the frequency and intensity of the opposition diminished.

But the opposition did not completely vanish. Chapter five documents the literary and political anti-Carduccianism from 1880 to the poet's death in 1907. During this period Mario Rapisardi rallied a Sicilian group against him. Ruggero Bonghi and others branded his *Ca ira* sonnets sadistic; republicans assailed him for his conversion to the monarchy; Ugo Oietti condemned his literary nationalism; Alfredo Oriani adjudged him a bourgeois poet who had failed in his patriotic mission; Guido Fortebracci and *La Civiltà Cattolica* revived the Catholic hostility against him.

Despite these assaults Carducci's fame continued unimpaired until 1910, when Enrico Thovez wrote an adverse critique of the poet's full production. Croce defended Carducci as a poet, but regarded him a second-rate critic. Thovez's and Croce's critiques constitute the core of the posthumous polemic which is treated in the sixth chapter. This polemic is important in the history of Italian literary criticism because it precipitated the first test of the relative values of Carducci's *metodo storico* and Croce's aesthetics. When the polemic was over Carducci had ceased to be a controversial figure.

The conclusion deals with the educational value of Carducci's polemical prose.

JAMES JOYCE'S "DUBLINERS"

(Publication No. 2838)*

Marvin Magalaner, Ph.D.
Columbia University, 1951

Though James Joyce experienced great difficulty in publishing Dubliners, publishers found no fault with the symbolic content of the stories because they did not recognize its presence. This symbolic level may be partially accounted for by Joyce's desire to emulate literary predecessors whom he especially admired. The French symbolist poets gave him a precedent; Chekhov may have supplied a technique of indirection and given significance to the seemingly ordinary. George Moore, Turgenev, and Flaubert taught him that lives of peasants and civil servants could make interesting subject matter for literature. From other sources — Dante, Ibsen, the Roman Catholic Church — came precedent for using symbols. With these sources, Joyce worked out his own theory of symbol and called it epiphany.

The first three stories, about Dublin children, seem richly symbolic. "The Sisters," whose interesting evolution may be studied by comparison of its three versions (in The Irish Homestead, in the John J. Slocum Collection manuscript, and in the Dubliners version), approaches indirectly the problem of faith and belief in paralyzed Dublin. "An Encounter" reinforces the theme of search for a spiritual father and its inevitable disappointment. The third story of this group, "Araby," deals with the breach between hopeful illusion and sordid reality in an enervating environment.

Admitting that Dublin has its pleasant side, Joyce nevertheless preferred to treat its ugliness and decay. The degeneration of political integrity after Parnell is the subject of "Ivy Day in the Committee Room." By equating the atmosphere of the room to that of Hell and by suggesting the contrast between glories of the past and the emptiness of the present, Joyce effectively evokes decay. The breakdown in normal, social relationships, in wholesome love of man for woman, and of man for man, is the theme of "Two Gallants" and an important issue in "Clay." In "Grace," finally, the decay of a once vital religious belief is exhibited. Faith has become vanity and empty conversation.

The alternative to living amidst decay is escape. Joyce himself took that road, and in his stories several of his characters try also.

* Microfilm copy of complete manuscript of 298 pages, \$3.73.
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"Eveline," an early sketch, shows how environmental bonds and a sacred oath paralyze the will and ability to escape. Explicitly, "The Boarding House" analyzes the problem of escape from conventional morality and economic necessity. The answer is pessimistic. Similarly, in "A Little Cloud" and "Counterparts," the unpleasant conclusion seems to be that ordinary citizens of Dublin are doomed to paralyzing routine, incapable of escape.

The two most poetic stories of the collection deal with love and death. "A Painful Case," though relying heavily on Nietzsche and Hauptmann, for characterization and moral theme respectively, emerges as much more than a tour de force. It is the tender story of a man who brings tragedy upon himself by his inability to return proffered love or to feel normal emotion. In "The Dead," the concluding novelette, another man whose emotional values are false is shocked into more normal human awareness by newly acquired knowledge of his wife's dead lover.

Though criticism of Dubliners has been sparse, Joyce has been attacked by Marxists for his art for art's sake attitude, by Humanists for his ostensible lack of discipline in later books, and by Irish Nationalists and religionists for heresy and "desertion." Serious literary critics like Levin, Daiches, Tindall, and others have been loud in their praise.

Study of Dubliners proves one point: the book should not be studied in and for itself. In style, tone, and thematic development it falls neatly into the Joycean canon and must be examined as an integral part of Joyce's total literary output.

A CRITICAL STUDY OF THE HISTORIA MERIADOCI

(Publication No. 2843)*

William Bernard Mullen, Ph. D.
Columbia University, 1951

The Historia Meriadoci is a biographical Arthurian romance in Latin prose which was translated from a non-extant French metrical romance by an author known only as R. It is one of the few Arthurian romances which have come down to us in Latin, and is chiefly interesting to scholars because it preserves the materials of vernacular romances which otherwise would have been lost. This study attempts to settle disputed questions of date and authorship

* Microfilm copy of complete manuscript of 129 pages, \$1.61. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-580.

and includes a study of the origins of certain traditional motifs, together with an index of proper names.

The principal motifs in the romance — the Ford Combat, Fairy Mistress, Perilous Castle, and Abduction — consist largely of traditional material which is paralleled in other Arthurian romances and which seems to derive ultimately from older Irish and Welsh stories. The enfances of Meriadoc, on the other hand, appear to have originated among the Scandinavians in England.

The strongest evidence for the nationality of our author is afforded by the twice-repeated phrase "the snowcapped mountain which is called Snowdon in Welsh." The author could not have been a Welshman, for Eryri was the genuine Welsh name of the mountain. Such a statement implies that the author was English or Anglo-Norman, for Snowdon was the usual name employed by persons living in England to refer to Welsh Eryri.

The only evidence for the authorship of Robert de Torigny, the twelfth century abbot of Mont St. Michel, lies in the unsupported statement of John Bale, the sixteenth century antiquary. Aside from the improbability of such an early dating, it is unlikely that a monk could have written this Arthurian romance, for in Robert's time monks were often hostile to Arthurian fiction and to the popular veneration of King Arthur himself. In addition, the monastic author usually revealed his vocation in his work, and it seems improbable that a monk like the abbot of Mont St. Michel could have written this wholly secular work. The anonymous author of the Historia Meriadoci cannot be plausibly identified with any writer of the period under discussion. He was a learned man, probably an ecclesiast of secular tastes, and was living in England.

The chief evidence for dating the Historia Meriadoci is a detail of costume found in the companion romance, De Ortu Waluuanii. There the hero introduces the new fashion of wearing a surcoat over the armor and receives the nickname, Knight of the Surcoat. Pictorial examples and literary references indicate that the surcoat was worn sporadically in the latter half of the twelfth century and was almost universally adopted at the very end of the century. The use of the surcoat in the romance points to a time of composition near 1200, a time early enough in the adoption of a new fashion for people to be interested in its origin, and yet late enough in its general adoption for the nickname to have some point.

In the discussion of proper names it is suggested that the Latin author substituted names from Geoffrey of Monmouth's Historia and the Latin chronicles for the names in his French source. Such a conclusion seems justified in view of the fact that the romancers made no consistent use of Geoffrey and rejected a large part of the onomasticon his book provided, and that the historians and learned clergy did read and make use of Geoffrey.

HUMANITAS IN TUDOR LITERATURE

(Publication No. 2872)*

Elias H. Phillips, Ph.D.
University of Pennsylvania, 1949

Complete expression of Ciceronian humanitas first appeared in English literature during the period 1475-1575. In this century the Prefaces and Epilogues to William Caxton's publications (1475-1491), Sir Thomas More's Utopia (1516), Sir Thomas Elyot's The Book Named the Governor (1531), Thomas Starkey's A Dialogue between Cardinal Pole and Thomas Lupset (1535), William Baldwin's A Mirror for Magistrates (1559), Sir Thomas Hoby's translation of Castiglione's The Book of the Courtier (1561), and Roger Ascham's The Schoolmaster (1570) offer evidence of being written and read under the influence of that unique philosophy of world order, belief in paideia, and conception of the dignity of man which characterizes Cicero's humanitas.

The concept that the political order of the commonwealth, maintaining human alliance and assuring justice, coincides with the moral and physical order of the universe receives clearest expression in The Governor and The Courtier. Caxton's comments upon the horrors of civil war, Starkey's judicious exposition of the orderly state, More's witty and ingenious design for the ideal state, and the demonstrations in the Mirror for Magistrates against rebellion reveal that faults existing within society can be corrected gradually through growth of right reason in those carrying on the state's affairs.

Under the influence of this belief in order, each writer, regarding man as the chief creation in the universe, maintains that man, endowed with reason, is capable of perfection through paideia. Caxton considers it a duty "to enforme and to late vnderstonde wysedom and vertue" through his publications. To More the studia humaniora are the source of learning to be practically applied for the common welfare. Starkey proposes education of the young, the nobility, and the clergy for eliminating social evils and assuring justice. The laments of the Cornish blacksmith, James I of Scotland, and Cardinal Wolsey in the Mirror for Magistrates confirm the value of training in the liberal arts. The Governor, The Schoolmaster, and The Courtier, plans for the education of those

* Microfilm copy of complete manuscript of 184 pages, \$2.30. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-608.

anticipating political careers, demonstrate that the learning a man achieves should not be utilized for personal attainment, but should be devoted to the welfare of the state and for the common good.

The Governor and The Courtier offer representations of ideal men brought to a state of perfection through paideia. More emphasizes virtuous conduct patterned "according to nature, that is, rationally after the pattern of God." Starkey declares positively that man is capable of living virtuously and in a manner appropriate to his dignity under the rule of right reason. In the Mirror for Magistrates the lamentations of those who have fallen from high estate provide vivid appeals to those occupied with civic affairs to live by reason and to conduct themselves under the principles of wisdom, temperance, fortitude, and justice.

These authors affirm that it is within the power of each man, perfected through paideia, to act in a manner that he will become a glory to himself, a source of service to his friends, and a profitable member of the commonwealth. Appealing to his readers to be conscious of their dignity as men, each counsels conduct to uphold this dignity. Under the influence of man's proper nature, each maintains, men may enjoy a virtuous and most blessed conspiracy of right reason, genuine fellowship, true knowledge, and justice.

The actualities of the age may not reflect Ciceronian humanitas, but the ideal is evident in the influential literature of the century. For the first time in English literature, writers endeavored to capture and to present humanitas in a form calculated to stimulate the thinking and to shape the conduct of their readers.

MATHEMATICS

THE EFFECT OF PRELIMINARY TESTS OF SIGNIFICANCE ON THE SIZE AND POWER OF CERTAIN TESTS OF UNIVARIATE LINEAR HYPOTHESES

(Publication No. 2794)*

Robert Eric Bechhofer, Ph.D.
Columbia University, 1951

It is a common procedure among applied statisticians who use the analysis of variance to conduct preliminary tests of significance in order to determine whether or not interaction sums of squares

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should be pooled with the error sum of squares when testing the significance of main effects. The procedure that they follow for the so-called Model I of the analysis of variance is considered below in canonical form.

Let X_1, \dots, X_{r_1} ; $Y_1, \dots, Y_{r_2+r'_2}$; Z_1, \dots, Z_{r_3} be $r_1+r_2+r'_2+r_3$ normally and independently distributed chance variables with means $0, \dots, 0$; $\mu_1, \dots, \mu_{r_2+r'_2}$; ν_1, \dots, ν_{r_3} , respectively, and a common variance σ^2 . The μ_j , ν_k , σ^2 are unknown parameters.

For a two-way classification of the analysis of variance with the same number (greater than one) of observations in each cell, the μ_j ($j = 1, \dots, r_2$) and the ν_k ($k = 1, \dots, r_3$) are associated with the row and row-column interaction "effects," respectively;

$\sum_{i=1}^{r_1} X_i^2$, $\sum_{j=1}^{r_2} Y_j^2$, and $\sum_{k=1}^{r_3} Z_k^2$ are associated with the error, interaction, and row sums of squares, respectively.

The null hypothesis is $H_0: \mu_1 = \dots = \mu_{r_2} = 0$. The standard

test (T_2) of H_0 is an F-test involving $U = \frac{\sum_{k=1}^{r_3} Z_k^2}{\sum_{i=1}^{r_1} X_i^2}$. If $\mu_1 = \dots = \mu_{r_2} = 0$, a uniformly more powerful test (T_3) of H_0 is an F-

test involving $\frac{\sum_{k=1}^{r_3} Z_k^2}{(\sum_{i=1}^{r_1} X_i^2 + \sum_{j=1}^{r_2} Y_j^2)}$. However, if $\sum_{j=1}^{r_2} \mu_j^2 / \sigma^2$ should be large, T_3 would have low power. When the statistician believes, based on past experience, that the μ_j 's equal zero, but wishes to protect himself against the possibility that they do not, he can use a preliminary F-test (T_1), i. e., he pools (uses T_3) or

does not pool (uses T_2) accordingly as $V = \frac{\sum_{j=1}^{r_2} Y_j^2}{\sum_{i=1}^{r_1} X_i^2}$ is less than or greater than some preassigned constant.

The power of the composite test $[T = (T_1 \text{ plus } T_2 \text{ or } T_3)]$ depends on r_1, r_2, r_3 ; the levels of significance $\alpha_1, \alpha_2, \alpha_3$

associated with T_1, T_2, T_3 , respectively; and $\lambda_2 = \sum_{j=1}^{r_2} \mu_j^2 / 2 \sigma^2$ (the nuisance parameter) and $\lambda_3 = \sum_{k=1}^{r_3} \nu_k^2 / 2 \sigma^2$.

A formula is derived for the size (Type I error) of T when r_1, r_2, r_3 are even; a similar formula is derived for the power when $\lambda_2 = 0$ and r_1, r_2, r_3 are even. Several sets of computations for the size and power are made based on these formulae.

The behavior of the size and power of T as a function of λ_2 and λ_3 is characterized. It is shown that the power curve considered as a function of λ_2 for fixed $r_1, r_2, r_3; \alpha_1, \alpha_2$, and λ_3 will have one of three basically different shapes according to the value assigned to α_3 .

The special case $r_1 r_2 r_3 = 2$ is considered in detail. The effect of changes in r_1, r_2, r_3 on the size and power is studied.

The region of rejection of the test T is studied. Three different classes of tests belonging to T are defined according to the shapes of their regions of rejection (which shapes depends on α_1, α_2 , and α_3). Propositions are proved concerning the relative powers of these tests when $\lambda_2 = 0$.

It is shown that certain choices of $\alpha_1, \alpha_2, \alpha_3$ yield tests T that have desirable properties. A method is described whereby the applied statistician can make use of inexact a priori information concerning the value of the μ_j to assist him in choosing among the tests T_1, T_2 , and T_3 .

The nonexistence of a uniformly most powerful test of the simple hypothesis: $\lambda_2 = \lambda_2^0 > 0, \lambda_3 = 0$ vs. the composite alternative: $\lambda_2 = \lambda_2^0 > 0, \lambda_3 = \lambda_3^0 > 0$ for the class of tests based on the statistics U and V is proved.

The relation of this work to that of earlier work done by Dr. Allen Paull for a different model (Model II) of the analysis of variance is discussed.

**THE ECONOMIC USE OF THE SAMPLE MEAN RANGE
IN ACCEPTANCE INSPECTION FOR PROPORTION
DEFECTIVE BY VARIABLES**

(Publication No. 2801)*

Edward Pearson Coleman, Ph.D.
Columbia University, 1951

The engineer constantly seeks methods for simplifying the application of scientific principles, facilitating decisions, and expediting action. To aid in the accomplishment of these objectives in sampling inspection for proportion defective p by variables, a new statistic $g_{m,n} = (U - \bar{x})d_n / \bar{w}_{m,n}$ is introduced. For a random sample x_i , $i = 1, \dots, N$, drawn from a normally distributed inspection lot with unknown population mean μ and unknown population standard deviation σ , this statistic is called non-central g with group choice $N = mn$ and displacement $\delta_g = \sqrt{N} (U - \mu) / \sigma$. It involves the sample mean \bar{x} , the sample mean range $\bar{w}_{m,n}$ of m random groups with n observations each, the expected value of the sample range $d_n = E(w_n)$ of the standard normal variable, and the constant specification limit U . An item of product is defined as defective if its measurement x_i is greater than U . (The case of a defective item being defined by $x_i < L$ is also treated, but the case of $L < x_i < U$ is not considered).

The new statistic $g_{m,n}$ is a modification of the classical non-central t statistic in that the unbiased estimate of the normal population standard deviation σ is based on the sample mean range $\bar{w}_{m,n}$ instead of the root-mean-square estimate with $N - 1$ degrees of freedom. The non-central g statistic is proposed as a basis for testing the hypothesis that "the submitted inspection lot is of acceptable quality" against the alternative hypothesis that "the submitted inspection lot is below acceptable quality." These hypotheses are treated as simplified one-dimensional composite hypotheses, and we express them in the respective forms of $H_0: (U - \mu) / \sigma = K_0$ and $H_1: (U - \mu) / \sigma = K_1$, where $K_1 < K_0$ are specified constants.

* Microfilm copy of complete manuscript of 132 pages, \$1.65.
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By methods similar to those of Patnaik, expressions yielding approximate values for a scale factor c and fractional degrees of freedom ν are found so that the probability density function of $\bar{w}_{m,n}/\sigma$ is approximated by the probability density function of $c\chi^2/\sqrt{\nu}$. The approximate values for c and ν are determined by equating respectively the means and variances of the two distributions.

By use of these approximate results, methods are shown for computing a set of approximate lower percentage points $g_{1-\alpha}$ such that $\Pr(g_{m,n} > g_{1-\alpha} | H_0) = 1 - \alpha$. Similarly, the operating characteristic values $C(K_1) = \Pr(g_{m,n} > g_{1-\alpha} | K_1)$ may be found. Thus methods are shown for comparing the statistical efficiency of non-central g to that of another statistic, say, non-central t .

Systematic methods for designing single sampling plans based on non-central g are shown. Expeditious numerical and graphical methods of applying these single sampling plans are devised. Therefore, the basic computing methods have been formulated so that for the first time the necessary computations for the practical use of the sample mean range in acceptance inspection for proportion defective by variables is feasible.

HOMOLOGY AND COHOMOLOGY OF ALGEBRAS

(Publication No. 2811)*

Arnold Lionel Fass, Ph.D.
Columbia University, 1951

The present paper presents a unified homology and cohomology theory for linear algebras. For an algebra A , a theory is constructed applying to A as an element of a class of algebras governed by a system $\{L\}$ of multilinear identities, and with coefficients in a vector space R which is an $\{L\}$ -representation space for A . A free representation is defined as one for which there is a set of elements having the property that any map of this set into any representation space extends uniquely to a module homomorphism. The existence of such a representation is demonstrated, and it is constructed in convenient form.

We next define a chain complex over A , and construct the spaces of boundaries and cycles, and the homology spaces of the

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complex in the usual way. Chain transformations, i. e., special types of maps of the complexes, are defined, as is the concept of homotopy of two chain transformations. Coefficients are introduced and cohomology defined by means of maps of the chain spaces of the complex into the coefficient module.

A subcomplex of the chain complex is considered, defined in terms of the operators on the chain spaces and the coefficients, and the factor complex is constructed, yielding the residual and equivariant spaces of the complex, both for homology and cohomology. It is seen that the ordinary, residual, and equivariant homology and cohomology spaces form exact sequences. If chain transformations are equivariant, that is, commute with the operators of A , they induce maps of the homology and cohomology spaces. If two chain transformations are equivariantly homotopic their induced maps are the same.

A free acyclic complex is defined as one for which the chain spaces are all free representations and the ordinary homology spaces vanish, with a special construction in dimension zero. It is shown that chain transformations and homotopies may be extended through increasing dimensions in an equivariant fashion, if certain chain spaces are free and certain homology groups (ordinary) are zero. A constructive existence proof for the desired type of complex is given, and it is demonstrated that the equivariant homology spaces of such a complex are an invariant of the algebra within its class, so that the homology theory is a theory for the algebra rather than the complex. The effect of adjoining a unit element to an algebra is investigated, and yields a generalization of a theorem of Hochschild for associative algebras, to a larger class of algebras.

The final section of the paper is concerned with constructions for certain classical cases. The main results are the following. Since the regular representation of a commutative associative algebra with unit is free, all homology spaces vanish. For the ordinary associative case the construction yields the cohomology of Hochschild. For the case of Lie algebras the Chevalley-Eilenberg theory is given by these methods. A special construction due to J. L. Koszul is also introduced in the Lie case. Constructions are also given for the free ($\{L\}$ empty) and commutative cases.

METRIC METHODS IN INTEGRAL AND DIFFERENTIAL GEOMETRY

(Publication No. 2879)*

Jerry William Gaddum, Ph.D.
University of Missouri, 1951

The present study is divided into two parts, Part I being concerned with the integral geometry of an arc in a metric space and Part II with the differential geometry of arcs in Euclidean three-dimensional space.

Part I develops a concept known as the spread of a mapping. If A is an arc in a metric space, I_1 the unit interval, and f a homeomorphism of I_1 onto A , we write $p = f(x)$, $p \in A$, $x \in I_1$. If $\lim_{x,y \rightarrow t} \frac{f(x)f(y)}{xy}$ exists, it is denoted by $f'(t)$ and called the spread of f at t .

The principal theorems proved are: 1) if $f'(t)$ exists on a set $T \subset I_1$, it is continuous on T ; 2) if $f'(t)$ exists on the interval $[a, b] \subset I_1$, $A_f(a, b)$ is rectifiable and its length $s_f(a, b)$ is given by $s_f(a, b) = \int_a^b f'(t) dt$; 3) if $f'(t)$ exists different from zero, then $\lim_{x,y \rightarrow t} \frac{s(x, y)}{xy} = 1$, where $s(x, y)$ is the length of arc from $f(x)$ to $f(y)$.

Part II is devoted to a metric development of the differential geometry of arcs in E_3 . If p_1, p_2, p_3 are three points of a metric

space, $K(p_1, p_2, p_3)$ denotes $\frac{\sqrt{-D(p_1, p_2, p_3)}}{p_1 p_2 \cdot p_2 p_3 \cdot p_1 p_3}$. If p_1, p_2, p_3, p_4 are four points of a metric space, with no triple linear, $T(p_1, p_2, p_3, p_4)$ denotes the positive square root of $T^2(p_1, p_2, p_3, p_4) =$

$$\frac{18|D(p_1, p_2, p_3, p_4)|}{[D(p_1, p_2, p_3)D(p_1, p_3, p_4)D(p_1, p_2, p_4)D(p_2, p_3, p_4)]^{\frac{1}{2}}}$$

If p is a point of an arc A , $K(p) = \lim_{p_i \rightarrow p} K(p_1, p_2, p_3)$ and $T(p) = \lim_{p_i \rightarrow p} T(p_1, p_2, p_3, p_4)$ where the p_i are points of A . $K(p)$ and $T(p)$ are called the metric curvature and torsion, respectively, of A at p .

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In Euclidean space they assume the following forms:

$$K(p) = \lim_{p_i \rightarrow p} \frac{2 \sin(p_3; p_1 p_2)}{p_1 p_2},$$

$$T(p) = \lim_{p_i \rightarrow p} \frac{3 \sin(p_1 p_2; p_3 p_4)}{p_3 p_4}.$$

An arc A in E_3 is called bi-regular if the metric curvature and metric torsion exist, each different from zero, at every point of A . It is known that a bi-regular arc is rectifiable. It is shown in this paper that if the points of two bi-regular arcs C and C' can be put into one-to-one correspondence, preserving arc-length, curvature, and torsion, then the arcs are congruent. The proof of this theorem is given using entirely metric methods.

It is shown that a bi-regular arc possesses a moving trihedral at each point and that the Frenet-Serret formulas hold, thus providing the machinery for a further development analogous to the classical theory of analytic curves.

In conclusion, a chain of relations is established showing that the existence of metric curvature implies the existence of the spread under a suitably chosen mapping.

THE EXACT MATHEMATICAL THEORY OF MULTIPLE SCATTERING OF PARTICLES IN AN INFINITE MEDIUM

(Publication No. 2816)*

Carl Clement Grosjean, Ph. D.
Columbia University, 1951

In this dissertation, we have tried to solve exactly several multiple scattering problems in an infinite medium. In an earlier research work, we have elaborated a method to treat the diffusion of thermal neutrons out of a point source in a very extended medium. It is known that for instance in the case of strong absorption, the density distributions are not exactly described by the solutions of the elementary diffusion equation. With the new method it was possible to obtain equations and solutions for various probability distributions related to the problem but the results were in fact equivalent to the ones obtained in the problem of random flights.

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However, the method was different and we have been able to extend it to the general non-isotropic multiple scattering problem. Therefore, in this present work, we have first explained the procedure in the isotropic case, treating a few stationary and time-dependent problems. Although some new results are presented, the first chapter is primarily written as a preparation to the second chapter, where the non-isotropic case is solved in the most general way in which it can be formulated. Without introducing any simplifying assumption or approximate calculation, the solutions of the equations are completely obtained in an explicit form. They would require much computation work in the general case, but it is practically always possible to obtain simpler expressions, by introducing a simplification, the validity of which can be carefully checked. A practical example on the two parameter theory, is given in the case of elastic s-scattering of neutrons by nuclei. Very accurate results are derived in the paragraph treating that particular problem. Of course, the energy and the time dependence are also important factors, which should be introduced in the theory. In the last two paragraphs we have shown how these factors are taken into account in the general case. We have already worked out several examples based on the general solutions in the energy dependent case, which we hope to publish later. We have also mentioned a few approximations we have been able to calculate.

The theory as it is presented in the second chapter, is connected with the problem of random flights in the sense that it is a generalization of it. When we suppose isotropy in the theory, the results reduce exactly to those obtainable from the theory of random flights. The theory is also somewhat in connection with the calculations by Goudsmit and Saunderson,¹ for what the angular distributions are concerned. However, the present method gives exactly both the angular and radial distributions after a given number of collisions or after an arbitrary number of collisions. In the physical cases, the fundamental equation we have built up, is a kind of integrated form of the transport equation. However, in most of the recent publications, where the authors start with the transport equation, they apply a Fourier transform to the whole equation. In the case of the point source as we have treated, it is seen that only the terms in the Legendre polynomial $P_0(\cos\theta)$ can be nicely represented by a Fourier integral with respect to the coordinate r . But the other terms are represented by Fourier-Bessel integrals. Therefore, in our method we had to split the fundamental equation in a series of equations between the various radial functions, and

1. Phys. Rev., 57, 24; or Mott and Massey "The Theory of Atomic Collisions," p. 197 (1949).

the operations which we perform are equivalent to taking a different transformation for each separated equation. We have tried to explain as clearly as possible how we have been able to find all these transformations, suitable for this purpose.

HYDRODYNAMIC PROPERTIES OF AN ELECTRON GAS

(Publication No. 2731)*

Bernard Eufinger Howard, Ph.D.
University of Illinois, 1951

This paper presents a mathematical basis for describing the flow of an electron stream. It is shown that the macroscopic motion of the medium is governed by the following vector non-linear differential equation:

$$\rho \left(\frac{\partial}{\partial t} + \mathbf{U} \cdot \nabla \right) \mathbf{U} = \mathbf{F} - \nabla p + \sigma [\nabla^2 \mathbf{U} + \frac{1}{3} \nabla (\nabla \cdot \mathbf{U})] \\ + [\mathbf{U} \cdot \nabla] \mathbf{U} + \mathbf{U} (\nabla \cdot \mathbf{U}) = \frac{1}{3} \nabla (\mathbf{U} \cdot \mathbf{U})]$$

where ρ = mass density

\mathbf{U} = velocity

\mathbf{F} = force per unit volume

p = pressure

σ = tangential coefficient of viscosity

γ = normal coefficient of viscosity

This equation is analogous to the Navier-Stokes equation of hydrodynamics, but contains additional terms due to the charge on the electrons. σ is the coefficient of viscosity familiar in hydrodynamics; γ represents the effect of the Coulomb forces. One effect of this force is to cause the pressure normal to the direction of flow to exceed that in the direction of flow. γ is then the difference in these pressures divided by the square of the velocity.

To establish the differential equation of motion, the forces acting are classified as (a) body forces and (b) surface forces. It is shown that the surface forces may be expressed as a divergence of a symmetric tensor. The motion of any continuous medium is then governed by the equation

$$\rho \left(\frac{\partial}{\partial t} + \mathbf{U} \cdot \nabla \right) \mathbf{U} = \mathbf{F} + \nabla \cdot \Psi$$

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where ψ is the stress tensor. To obtain a differential equation in the velocity it is necessary to write $\psi = f(u)$ and the determination of this function is a major problem. In this paper the following three-step process is employed.

First, a stationary particle is supposed to be acted upon by the rest field of another particle. The theory of relativity is employed to obtain the resulting forces when the particles are moving with arbitrary velocities, not restricted in direction as in the customary treatment in special relativity. Second, a statistical analysis of a large number of binary encounters between particles subject to this force just obtained, shows that the resulting force across a plane surface is some quadratic function of the velocity components. Third, properties of isotropic functions are investigated and employed to determine the particular quadratic function in an isotropic medium. This leads directly to the differential equation of motion.

The work is sufficiently general that an electron gas may be considered as a prototype of a more general class of biviscous fluids.

The usual analysis of an electron stream by the Lorentz force equation considers only body forces, and omits all but the first term on the right side of the differential equation. This corresponds to the theory of perfect fluids in hydrodynamics.

The theory presented in this paper is the appropriate tool for the treatment of such phenomena as resistance in an electron stream (dissipation of heat by internal stresses) and one type of noise in vacuum tubes (turbulent wake of grid wires). An expression is obtained for the resistance of an electron stream, which shows that the possibility of negative resistance is not excluded as in the case of ordinary fluids.

ON COHOMOLOGY THEORY FOR LIE ALGEBRAS

(Publication No. 2734)*

George Francis Leger, Jr., Ph.D.
University of Illinois, 1951

The purpose of this thesis is to study the cohomology groups of Lie algebras and to begin an interpretation of their role in the structure theory of Lie algebras. A partial interpretation of the first cohomology groups is given by the following theorem:

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Theorem: Let P and Q be representation spaces for a Lie algebra L and let R be the L -space of all operator homomorphisms of P into Q . Then there is a linear isomorphism of the vector space of equivalence classes of enlargements of Q by P onto $H^1(L, R)$.

A pseudo-representation of a Lie algebra L is a pair $[\phi, K]$ where ϕ is a homomorphism of L into the outer derivations of K . The center C of K becomes a representation space for L which we call the nucleus of $[\phi, K]$. We show that the similarity classes of pseudo-representations of L with the same nucleus form a vector space and further, that there is an isomorphism of this space into $H^3(L, C)$. That this isomorphism is not always onto can be seen by assuming L to be semi-simple. If we consider 1-cocycles of Lie algebras with respect to the regular representation we arrive at the derivations of L ; 1-coboundaries are just inner derivations, and we prove:

Theorem: If the derivations of the radical of a Lie algebra L split over the inner derivations of the radical, then the derivations of L split over the inner derivations of L .

Let (M, α) be an extension of L with kernel K, V a representation space for L . Make V into a representation space for M by setting $m \cdot v = \alpha(m) \cdot v$ for all m in M and all v in V . We consider relationships between $H^n(L, V)$ and $H^n(M, V)$ and show that there is a homomorphism α_n^* of $H^n(L, V)$ into $H^n(M, V)$. Further, for a given L and V there exists an extension (M, α) for which α_n^* is the zero homomorphism. In this case we have a simple interpretation of $H^2(L, V)$ as the cosets of operator mappings of K into V modulo those operator mappings which can be extended to elements of $Z^1(M, V)$.

A problem in cohomology theory which stems from the extension problem is the splitting of given n -cocycles. More precisely, given an arbitrary n -cocycle z , what must be done to L or V to make z cobound? In the above we have seen, at least in the case $n = 2$, that z can be made to cobound by extending the Lie algebra L . If L is solvable over a ground field of characteristic O , then V can be extended to a representation space V_1 so that if z is imbedded, in the natural way in $Z^n(L, V_1)$, then z is in $B^n(L, V_1)$. In general this cannot be done since the 3-dimensional cohomology group of a semi-simple Lie algebra over a ground field of characteristic O is never O with respect to a trivial representation.

A STUDY OF METRIC TORSION

(Publication No. 2900)*

John Wesley Sawyer, Ph.D.
University of Missouri, 1951

Among the many branches of mathematics to which the methods of Distance Geometry have been applied is differential geometry. It is with this application that the investigations of this paper are directly concerned.

In the past differential geometry was explored almost exclusively by methods of analysis, entailing the use of co-ordinate systems, equations, and the devices of the differential calculus. This procedure necessitates assumptions which are foreign to the geometric nature of the questions involved and which greatly restrict the generality of the results obtained.

The first concept of differential geometry to be studied in a purely metric manner is that of curvature of curves. Metric definitions of curvature were given by Menger, Alt, Gödel, and, more recently, by Haantjes. In 1936, a metric definition of surface curvature was obtained by Wald.

In order to continue the program of metric differential geometry without co-ordinates, it is necessary to have a metric definition of torsion.

The first such definition was given in 1939 by Georges Alexits. There are, however, two main objections to his definition. It is (1) not symmetrical and depends upon the ordering of points, while (2) an iterated limit is used in defining torsion at a point.

In 1945 Leonard M. Blumenthal defined metric torsion in such a manner as to eliminate the disadvantages of the Alexits torsion.

It is the purpose of these investigations to study these definitions of torsion, with emphasis on the Blumenthal torsion.

Much of the early part of the study is taken up with comparisons of the various definitions.

Since it is desirable to have extended definitions coincide with classical definitions under proper circumstances, the first result establishes that the Blumenthal torsion $\tau_B(p_0)$ exists at a regular point p_0 of an analytic space curve and equals the absolute value of the classical torsion at p_0 .

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If p_0 is not a regular point, the Alexits and Blumenthal torsions may be defined at p_0 in a manner analogous to the definition of the classical torsion at p_0 ; that is, considering a regular point p in a neighborhood of p_0 , the torsion at p_0 is the limit of the torsion at p as p approaches p_0 .

Making use of this definition, it is shown that the Alexits and Blumenthal torsions exist and have as their common value the absolute value of the classical torsion at p_0 , a point of an analytic space curve, provided that a non-null tangent vector exists at p_0 .

In seeking conditions under which the Alexits and Blumenthal torsions are equal, it is found that if p is a point of a euclidean space curve with positive Menger curvature at p , and if the Alexits, Blumenthal, and Blumenthal star torsions exist at p , then the Alexits and Blumenthal torsions are equal.

This theorem is extended to subsets of a general metric space under the same hypotheses.

It is shown that the Blumenthal and Blumenthal star torsions may each exist independently of the other; however, if both exist, they are equal.

The latter portion of the study is concerned with this question:

If the Blumenthal torsion vanishes at each point of a metric arc, is the arc planar?

An example is given to show that such is not necessarily the case. However, the chief theorem of this section establishes conditions under which the above question may be answered in the affirmative.

Leading up to this theorem, it is proved first that if p is a point of C , a continuum in euclidean three-space and if a non-zero Menger curvature exists at p , a point of C , then if $\tau_B(p)$ exists, C has an osculating plane at p .

A lemma, together with its corollary, establishes that if a metric space A is an arc such that $K_M(p)$ exists for each point of A , then A is rectifiable.

Finally it is proved that if A is an arc of euclidean space having the property that a non-zero Menger curvature exists at each point of A , then a necessary and sufficient condition that A be planar is that the Blumenthal torsion be zero at each point of A .

ON DISTANCE FUNCTIONS, AND ON POLAR SERIES
OF CONVEX BODIES

(Publication No. 2862)*

Fritz Steinhardt, Ph.D.
Columbia University, 1951

1. A real-valued continuous function $F(x_1, \dots, x_n) = F(x)$ satisfying $F(x) > 0$ for $(x) \neq (0)$ and $F(\lambda x) = \lambda F(x)$ for $\lambda \geq 0$ is the distance function of the star body $S = \{(x); F(x) \leq 1\}$ in euclidean E^n . If the translate by (b) of S is also star with respect to (0) , its distance function is denoted by $F(x; b)$ and called equivalent to $F(x) = F(x; 0)$.

Theorem I states that $\frac{\partial F}{\partial b_i} + F \frac{\partial F}{\partial x_i} = 0$ ($i = 1, \dots, n$). Among the applications are simple proofs of integral identities for homogeneous functions.

If S is convex, and (ξ) a unit vector, a new formula for the projection $\sigma_{(\xi)}$ of S in direction (ξ) is obtained in terms of the equivalence family $F(x; b)$ associated with S , viz.

$$\sigma_{(\xi)} = \lim_{t \rightarrow 0^+} t \int_{(-b) \in S} F^{1-t}(\xi; b) dV_{-b}$$

where dV_{-b} is the volume element of S containing the point $(-b)$. This formula, in connection with a lemma on strongly convex bodies, yields a simple new proof of a convexity theorem of Minkowski's.

The average radii and vectors of a convex body are introduced and briefly discussed.

2. In analogy with the linear series connecting two convex bodies, as treated by Brunn and Minkowski, the polar series S_μ ($0 \leq \mu \leq 1$) connecting two star bodies S_0 and S_1 is defined as follows: S_μ is the star body with the distance function $F_\mu(x) = (1-\mu)F_{(0)}(x) + \mu F_{(1)}(x)$, where $F_{(0)}$ and $F_{(1)}$ are the distance functions of S_0 and S_1 , respectively. Theorem II states the following convexity properties of polar series (V denotes volume, S surface area): 1. $1/\sqrt[n]{V(S_\mu)}$ is a strictly concave function of μ unless $S_1 = \lambda S_0$; 2. If S_0 and S_1 (hence also the S_μ) are convex bodies, then $\log S(S_\mu)$ is strictly concave in μ unless $S_0 = S_1$.

An application of Theorem II is made to a new characterization of the circle among convex curves, stated in Theorem III: Let \mathcal{K} be any closed convex (plane) curve, P any point in the interior of \mathcal{K} ,

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and \mathcal{K}_P^* , the polar reciprocal curve to \mathcal{K} with respect to the unit circle about P. Then, L denoting length,

$$L(\mathcal{K}) L(\mathcal{K}_P^*) > 4\pi^2$$

unless \mathcal{K} is a circle and P its center.

MEDICINE

INFLUENCE OF PREGNANCY ON INFECTION OF MICE WITH THE COLUMBIA SK VIRUS OF MURINE POLIOMYELITIS

(Publication No. 2829)*

Alice Williams Knox, Ph.D.
Columbia University, 1951

Pregnant mice inoculated orally with Col.SK virus of murine poliomyelitis showed a definite increase in susceptibility to infection as compared with non-pregnant female control animals. Beginning with the fourth day of pregnancy, mortality rates increased progressively, and reached with the last four days of gestation a rate (88%) almost twice that of the control group (45%). Immediately after parturition there appeared to be a rapid return of resistance to the non-pregnant level (46%). The mechanism for the greater susceptibility of the pregnant mouse did not seem to depend upon alterations in permeability of the mucosa during gestation, since a smaller group of mice exhibited a similar increase in susceptibility when inoculations were carried out by the intravenous route. Mice inoculated during the first half of pregnancy by the oral route exhibited a high rate of abortion, whether or not they succumbed to the disease. Embryos in utero at maternal death consistently contained demonstrable amounts of virus; stillborn young, delivered at the time of onset of maternal symptoms, appeared frequently to have been infected in utero; surviving young of susceptible mothers, born during the maternal incubation period, were apparently normal, and usually escaped infection. A majority (89%) of surviving mothers resisted subsequent intraperitoneal infection with a challenge dose of virus that killed 90% of normal control animals. Of 11 resistant mothers, 10 reared litters which were fully protected against intranasal infection when tested between the ages of 23 and 44 days; between 66 and 68 days of age resistance

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was partial, but after 119 days there was no evidence of immunity. Interchange of normal infants with the young of immune mothers during the period of suckling disclosed that immunity in the young correlated with the observed immunity in the nursing mother, indicating the probable role of milk in establishing resistance in the infants. Milk collected from normal lactating mice contained no antiviral substances, while milk from immune mice, even upon dilution, was capable of neutralizing the virus in vitro.

PHILOSOPHY

MEANING AND NATURE: GEORGE H. MEAD'S THEORY OF OBJECTS

(Publication No. 2799)*

Andrew Lawrence Bowman, Ph.D.
Columbia University, 1951

Mead's writings — especially Philosophy of the Act and Philosophy of the Present — are examined critically in an attempt to explicate his metaphysic and epistemology and to determine their general philosophic fruitfulness.

Two questions are proposed to facilitate this study: In terms of what is any object the object that it is? and, In terms of what do we regard any object as the object we take it to be? By object we understand, in a general and untechnical sense, "physical thing," that to which one may in principle assign both a temporal date and a spatial location.

We argue that Mead's thought in this area must be understood as a revolt against two sorts of dualisms: the Cartesian "bifurcation" of nature into mind and matter, and the Newtonian "bifurcation" of the object into "real" and "apparent" qualities.

Mead first extends the domain of applicability of the concept of context, which he had found to be of value in psychological inquiry, and which seemed to find independent confirmation in Einstein's theories of relativity. He then adopts as fundamental the view that any object is the object that it is by virtue of its relations to any context within which it appears. He thus attempts to substitute a universe of objects existing inter se for the received universe of objects existing per se. Despite the implication that ultimately

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there is only one context — the “ordered universe” — in relation to which any object exists, Mead’s greatest concern is with his supposition that any “given” object may be different objects relative to different contexts or perspectives; “By what right,” he asks, “may they be considered the same object?”

For Mead the most important perspective is the perceptual: not only does perception (or episteme generally) constitute objects in so far as they are known, but also the “human social perspective” must be invoked to constitute objects in so far as they exist; that is, the “same” object in different perspectives (thus, different objects) may be organized into the object “itself” only in so far as these perspectives all lie within the scope of specifically human cognition; otherwise objects do not as such exist. It is in terms of this view as well as in terms of Mead’s view of nature as an “organization of perspectives” that we explore the hypothesis that Mead may have advocated a solipsistic position, although “inadvertently.”

Objects are constituted by human participation in two ways: by the manner in which they are perceived, and by the manner in which they are reacted to as perceived. Universality of the object relative to any individual lies in that individual’s habitual modes of perceiving and reacting. Social universality — i. e., the “identity” of the “same” object relative to different individuals — emerges only in so far as these individuals are implicated in common social acts.

Mead contends that his metaphysic is naturalistic despite the involvement of mind in the constitution of objects, for although mind is an emergent from nature, it is nevertheless a part of nature. He goes on to argue that emergence is the sine qua non of any change whatsoever, and thus also of a relativistic space-time.

Mead avoids the great practical difficulties of a general contextualism by his theory of analysis and by his conception of the problem-relation.

These matters are considered in five chapters: The Object of Analysis; The Perceptual Act and Object; Of Time and the Object; The Social Act and Object; and Biological Solipsism.

We conclude generally that Mead’s “revolt” has generated problems no less formidable in their own right than those he would have it eliminate.

THE THEOLOGIES OF THE AMERICAN SOCIAL GOSPEL
A STUDY OF THE THEOLOGICAL AND PHILOSOPHICAL
PRESUPPOSITIONS OF THE AMERICAN SOCIAL GOSPEL

(Publication No. 2809)*

Harold Allen Durfee, Ph. D.
Columbia University, 1951

The thesis deals with an analysis of the theological and philosophical presuppositions of the American Social Gospel, and attempts to indicate the unity and diversity of theological positions within the movement. The Social Gospel is understood as the reaction of a group of American evangelical Protestants to the problems presented by the industrial revolution.

The dissertation indicates movements in the background of the Social Gospel including Sectarianism. Calvinism, the Enlightenment, and English Christian Socialism. It then analyses the theology of Americans who anticipated the Social Gospel writers. These include Horace Bushnell, Theodore Munger, Samuel Harris, Elisha Mulford, and John Bascom. The importance of Horace Bushnell in the development of Social Christianity is emphasized.

There is then an analysis of the doctrine of God, man, the Christ, and the Kingdom of God as these doctrines were understood by leading representatives. In the early period special attention is given to the thought of Washington Gladden. Chief among the others considered are Lyman Abbott, Josiah Strong, George Herron, William D. P. Bliss. In the middle period special attention is given to the theology of Walter Rauschenbusch. The others considered as representative of the middle period are Harry C. King, Shailer Mathews, Henry C. Vedder, George Harris, Charles D. Williams, V. Scudder, and J. H. W. Stuckenberg. The representatives of the late period are F. J. McConnall, C. A. Ellwood, E. F. Tittle, C. C. Morrison, Harv F. Ward, and Kirby Page.

The Social Gospel writers emphasized the immanence of Deity. This emphasis furnished ground for the interpretation of all other doctrines. Such a doctrine was in danger of semi-pantheistic interpretation, and during the late period of the movement tension between the immanence and transcendence of Deity appeared quite clearly. The Social Gospel theologians noted the essential likeness of man and God, and interpreted in this way the doctrine of the image of God. The optimism of the writers led them to emphasize the

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fact that man was capable of vast progress, and that he was essentially reasonable and good. In the analysis of both man's sin and his salvation special attention is given to the social nature of these realities. Man's sin was thus usually understood as rebellion against God, due to man's corrupt institutions or to the lack of development in man's higher spiritual capacities thus far in the evolutionary process. There was constant confusion concerning the relation of man's freedom to this evolutionary development.

The doctrine of the Christ emphasized the humanity of Jesus and His essential unity with mankind. There was an emphasis upon Jesus' teachings and His ethical character, including His God-consciousness. It is usually through these factors that Jesus offers man salvation. There was also an emphasis upon the doctrine of the Kingdom of God throughout the movement. The Kingdom is the divine society which is being created. There was a tendency to expect its coming within history, although there is some indication of non-historical eschatological tendencies in the expectation of the coming of the Kingdom. The emphasis upon divine immanence and evolution favored optimism concerning the coming of the Kingdom by natural processes.

The movement is viewed as a strong expression of idealistic philosophy, although an anti-metaphysical tendency appears in many places. As a part of this idealism the Social Gospel theologians were confronted with the problem of interpreting process in theistic terms. Thus the movement appears as one of the first attempts in American Protestantism to face the problems of the philosophy of process and change (characteristic of much of modern philosophy, especially Pragmatism and Neo-Realism), and to give an idealistic version of evolution and history.

The contribution of the movement lies largely in its recognition of social responsibility on the part of the Christian; the realization of the importance of this world as the scene of salvation; and the importance of social realities for the interpretation of Christian theology.

THE UNIQUENESS AND INTELLIGIBILITY OF VALUE

(Publication No. 2785)*

Wadad Habib Saïd, Ph.D.
Bryn Mawr College, 1951

The problem with which this paper deals is the essential one of how a theory of value can find place for both the subjective, unique, individual experience of value and the objective, universal criteria that are finally determinative of all valuations.

The first chapter briefly discusses, in the light of our problem, the three main movements in contemporary British and American theory of value — namely, intuitionism, positivism, and naturalism. The first two avoid the problem in so far as they discard one or the other aspect of the question. The positivists deny that distinctive value statements are judgments at all; intuitionism neglects the personal experience of value in its intimacy and uniqueness. Perry, Dewey, and C. I. Lewis as representative of the naturalist movement attempt to bridge the gap between the personal, immediate aspect of value and its objective aspect. Perry tries to do this by deriving obligation from an organization of interests based on the quantitative measures of intensity, preference, and inclusiveness. Dewey seems to think of the "ought" as what would satisfy a situation after an inquiry and research into the conditions and consequences of the problematic state of affairs. These two methods are not successful. The "ought" cannot be completely derived from or reduced to empirical terms. Lewis, realizing that, makes a distinction between the field of valuation and that of ethics. However, his own effort to explain obligation by means of a rational imperative is not too satisfactory in that it is still based on a theory that conceives of the value experience as wholly unique, natural and individual and leaves the social nature of obligation unaccounted for.

In view of these criticisms the second chapter tries to suggest a solution to the problem through a different conception of the exception of the experience of value. Satisfaction, as the value experience, is thought of as the confluence of the "is" and the "ought," as the meeting point of what is actually desired and what ought to be. Such a view, however, requires that the value experience be conceived as both matter and form, a "that" and a "what," the natural and the ideal. In this way, the universal is, in a sense, within the particular. As such the individual experience of value has

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within it reference to possibilities for further such experiences that claim to be realized. This characteristic of the immediate value experience is the ground of the possibility of its being desired and of its being conceived as an "ought."

The various realizations of value, however, create conflict. Not all possibilities of value can be actualized. Thus there is need for some organization or manner of synthesis among the various value experiences. The experiences that form a lifetime are related in such a manner that they form a temporal gestalt that is more than the sum of the parts and forms a unit. The value of this lifetime viewed as a whole supercedes that of the individual value experiences and is determinative of those values that are to be realized and included in it. The nature of a temporal whole being a unit, each lifetime is equal to every other since each can be viewed as a possibility for the actualization of value. This is at the basis of the social nature of obligation. As a possibility for value each lifetime as a whole has an equal claim to be realized as every other lifetime; hence the obligation to respect the rights of others.

Thus by conceiving of the experience of value as both unique and intelligible, there need be no separation made between the fields of valuation and ethics. Both the immediate experience of value and the universal judgment of obligation find a place.

THE WRITER'S IMAGE OF THE WRITER: A STUDY IN
THE IDEOLOGIES OF SIX GERMAN AUTHORS, 1918-1933

(Publication No. 2819)*

Peter Heller, Ph.D.
Columbia University, 1951

The present work is a study in divergent philosophies of life by way of an investigation into the ideas and sentiments which six authors of the Weimar Republic associated with the nature and function of the creative writer. An attempt is made to discover the leading preoccupations which find their expression in a given ideology. In turn, on the basis of structural analogies, common denominators are established. Thus the "ambivalent humanists" Thomas Mann and Hesse are compared to those who, like the nationalist conservative Grimm and the idealistic socialist Toller, wavered between political activism and the adherence to an unpolitical tradition. Finally, both of these groups are related to the "radical

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activists" such as Jünger in his Fascist stage and the Stalinist doctrinaire Brecht.

To Mann the writer appears as a mediator between the opposites of "spirit" and "nature." His pervasive ambivalence is an aspect of the productive and infantile egocentricity which the author associates with the image of the artist, — an egocentricity which appears both as narcissism and as tendency towards self-laceration. Mann's demand for social consciousness arises in opposition to the artist's original loyalty to a "playful" and autonomous dream-life.

Foreign to external reality and barred from lasting, human relationships, Hesse's poet is in constant danger of being flooded by the boundless element of the "unconscious." Hesse's complex ideology is shown to be determined by the author's particular "inwardness," by his specific experience of isolation and of the infinite psyche.

Toller's ideology hinges on the "conflict of aggression," on the clash between the utopian demand for absolute love and brotherhood, and the aggressive, political activism which the author considers a tragic necessity for the progress of mankind.

Grimm advocates an escape from self-involvement. He preaches of the writer's role as humble servant and as mighty prophet of the German people.

In his first phase Brecht portrays the orgiastic lives of nihilistic minstrels. The revulsion from personal attachment, from "empathy" and, ultimately, from overt passivity, provides the common denominator between the early anarchist and the later doctrinaire. In Brecht's Communist Stage the claim to objectivity, the demand for a conscious, stylized and "theatrical" matter-of-factness are found to be emotional gestures. Brecht's scientism is subservient to his aim of propagandistic indoctrination.

In 1932 Jünger rejoiced in the downfall of the bourgeoisie and its cultural "museum." He found the positive aspects of the age in a heroic nihilism, in a gospel of work and violence. As mankind passed through the zero-point of destruction, Jünger envisaged the artist as calm, impersonal representative of the "worker." Dominated by the delight in "cruel" visual adventure and by the typically activist "split" between the demands for violence in the present and for harmony in the utopian future, Jünger could not quite conceal a conflict between the "romantic" traditionalism and the "technological" elements in his ideology.

In the conclusion this conflict is examined in all of the six authors. Their attitudes are compared with reference to such topics as "propaganda," "social responsibility," "individualism," the "cult of genius," and the "irrational." The discussion of "sadistic" activity and "masochistic" passivity in the experience of artistic inspiration, leads to the discovery of a phantasy of "masochistic

rebellion" which recurs in the works of the authors examined. Finally, pervasive ambivalence is discussed as a characteristic of literature in the 20th century and as a phenomenon correlated to the "accelerated rate of social change." As "disintegration" increases in speed and vehemence, "activism" appears as a counter-current within the general trend of overt ambivalence.

THE PHILOSOPHY OF NOAH PORTER (1811-1892)

(Publication No. 2823)*

Walter Thomas James, Ph.D.
Columbia University, 1951

The study of Noah Porter's epistemological and psychological criticism of American transcendentalism indicates that the two determining influences in Porter's early career as a student at Yale were the teaching of Nathaniel W. Taylor and the reading of S. T. Coleridge's Aids to Reflection. Taylor's common-sense conceptualism, dynamic interpretation of mental philosophy, dialectical use of language, and "progressive orthodoxy" were reinterpreted by Porter in the light of the introduction to German idealism and the scientific study of language through philology which Coleridge presented. The "absolute religion" of Theodore Parker and the theories of language of Horace Bushnell and Rowland Gibson Hazard were critically evaluated by Noah Porter.

The systematic philosophy of Noah Porter, "transcendental realism," was based upon a broad study of American and European thought but particularly upon the philosophies and linguistic theories of Karl Ferdinand Becker and Friedrich Adolf Trendelenburg. "Transcendental realism" was an attempt to reformulate the intellectual basis of New Haven orthodoxy in order to refute both Transcendentalism and British empiricism. The equation of language in its sentential form with language in its perceptual form through the agency of the human intellect implied the objective existence of universal relations by which both objects of matter and objects of spirit were ordered into an organic structure which found its ultimate principle of unity in the necessity of a correlated and knowable Absolute.

Porter's chief work, The Human Intellect was a study of contemporary psychological problems in terms of the critical relations which the mind discovered to be operative and necessary in

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its various acts of judgment. Such relations were only functionally definable but were fixed in language as the result of propositional "primitive combinations" arising out of certain basis types of motions. The act of judgment was a dynamic response of the mind to corresponding motions by which all material and spiritual entities were characterized. This essentially activist interpretation of the idealistic categories was equally characteristic of what was later known as "dynamic idealism." The relational theory of knowledge implied a metaphysics which culminated in a teleological functionalism.

Porter's criticism of Spencerian evolutionism in the United States and in Great Britain was based upon his systematic philosophy. "Transcendental realism," an organic interpretation of Nature in terms of a theory of objective relations derived from the metaphysics of motion, was held to be superior to the merely composite theory of evolution. Physiological psychology involved a conflict between its theory of knowledge and its theory of relations. The absence of any distinctive agency of knowledge led physiological metaphysics to a physiological phenomenalism. The laws of Nature were so interpreted as to favor the ethical aspirations of man, and thus the only sound laws of political economy were, in Porter's opinion, those of a humanitarian nature. The "science of man" was indispensable to an understanding of the "sciences of nature." The Noah Porter-William Graham Sumner controversy was but a single aspect of a broader criticism of Spencerianism in the perspective of differing educational philosophies. In controversy with the evolutionists, Porter did not fully exploit the possible applications of the Aristotelian theory of development inherent in his metaphysics. He made no original contribution to the study of ethics and lacked an original and genuinely comprehensive theory of science and religion. The psychological-metaphysical theory of relations of Noah Porter was more significant in its possibilities than in its fairly conventional realization.

NATURAL LAW AND CHRISTIAN ETHICS;
THE CONTEMPORARY CATHOLIC THEORY
OF THE MORAL ORDER

(Publication No. 2824)*

Graham Moffatt Jamieson, Ph.D.
Columbia University, 1951

The moral climate of our time has been shaken by the doctrines and acts of National Socialism in Germany, by the new standards and practices of Soviet Communism, and by the perplexities offered in and through our contemporary social situation. Skepticism over current absolutes and the widespread ethical relativism of our time both mirror and feed the perplexities. One of the results of this has been a forced reappraisal of what we shall term the concept of "moral order" as "ground" and as a basis for practical ethical application. The long tradition of natural law in Roman Catholic thought seems to provide an area in which old formulations may be appraised and new formulations of the problem considered.

The dissertation is a philosophical study of the grounds for and formulation of "moral order" in the natural law concept, in three parts:

PART I: The metaphysical problem concerning moral order is dealt with through an intensive study of the writings of Victor Cathrein, Jacques Maritain and Heinrich Rommen. Each man's philosophy is dealt with exhaustively in so far as it bears on this specific problem. In ferreting out their ideas the search leads to other thinkers who stress additional aspects of the general topic, and the quest is followed wherever it leads. The roots of the metaphysical problem are brought out in the examination of the following topics: History of the Natural Law Concept, the Thomistic Doctrine of Human Nature, the Concept of Natural Order, and the Thomistic Theory of Conscience and Obligation. With this background the philosophical formulation of the Natural Law is set forth. A discussion of Natural Law, Positive Law and the Common Good concludes this part of the study. The major concern is to lay bare the assumptions supporting the current formulation of natural moral law and to ascertain the grounds appealed to in support of these assumptions.

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PART II: The implications and applications of the natural moral law are investigated through a study of ecclesiastical and papal pronouncements on three sets of pressing problems:

1. The Status of Persons.
2. The Locus and Limits of Liberty and Authority.
3. The Role of Institutions: Church and State, Democracy, The Roman Catholic Church and Other Communions, Marriage and the Family, Education, Industry Councils, Social Reconstruction, Race, and The Law of Nations.

The primary purpose is not to evaluate the statements but to analyze the use of the natural law concept in its application in concrete instances of public import.

PART III: In appraising the extent to which this formulation of the natural law concept accords with contemporary findings re "nature" and "reason," and does justice to the problems of our historico-cultural "relativism," assessment and criticism center attention on:

1. The appeal to First Principles as axioms whose self-evidence is revealed to men by the light of natural reason.
2. The specific formulation of a moral order and an order of nature in Catholic philosophy.
3. The validity of positing unitary and circumscribed ends in human nature as originally created.
4. The universality of moral standards.

**THE PHILOSOPHICAL WORKS OF HERMANN VON
HELMHOLTZ: THE PHILOSOPHY AND EPISTEMOLOGY
OF THE GERMAN SCIENTIST**

(Publication No. 2826)*

Harry Russell Kahl, Ph.D.
Columbia University, 1951

Hermann von Helmholtz (1821-1894) was one of the greatest of nineteenth century scientists, making important contributions to mathematics, physiology, physiological optics, physiological acoustics, mechanics, hydrostatics and hydrodynamics, electrostatics and electrodynamics. In addition, during a long scientific career he made a number of investigations of perception, non-Euclidean geometry, counting and measurement, and the foundations of science, all of which fall within the field of philosophy. It is the

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purpose of this dissertation to investigate the philosophical work of Helmholtz and to state, in an expository manner, the conclusions which Helmholtz arrived at in philosophy.

After a brief biographical sketch, Helmholtz's conception of philosophy as being largely epistemology is presented, along with his criticisms of the metaphysical speculations which followed Kant in Germany. This in turn is followed by a consideration of Helmholtz's work in sensation and perception. Basing his extended investigations on Johannes Müller's law of specific nerve energy, Helmholtz concludes that our sensations are signs which must be interpreted by unconscious inference and experience. This interpretation leads to the perception of external objects and relations. Further investigation is made of Helmholtz's answers to the following two questions: 1) What is true in our sense perceptions and ideas? and 2) In what ways do our sense perceptions correspond with reality? In addition, consideration is given to Helmholtz's investigation of spatial perception and to his modification of Kant's conception of space.

Helmholtz's investigation of space perception led to a consideration of space in general and to a consideration of an empirical basis for the axioms of geometry. The six papers that Helmholtz wrote on the factual foundations of geometry are considered next. Among important points which appear in these papers are 1) an investigation of the factual foundations of geometry, 2) the development of a non-Euclidean geometry similar to Riemann's 3) an insight into the importance of non-Euclidean geometry for philosophy, 4) a criticism of the Kantian conception of space and the axioms of geometry.

Further consideration is given to Helmholtz's paper on "Counting and Measurement considered epistemologically" in which he carried out an investigation of the axioms of arithmetic. This investigation parallels that on geometry, and is followed by a consideration of the application of arithmetic in physical science.

Next, Helmholtz's reflections on science are considered, space being given to his conception of the purpose of science, the nature of science, the relationships among various sciences, the nature of a scientific law, and the use of abstract concepts in science.

This is followed by a concluding chapter in which an attempt is made to bring the earlier points of Helmholtz's work into clear perspective. His criticisms of the metaphysics of Schelling and Hegel are again emphasized along with his brief reflections on the course of modern philosophy. Helmholtz's philosophy is characterized as a causal, dualistic, realism, and is shown to be a continuation of the philosophy of Kant. At the same time an attempt is made to show how Helmholtz believed the Kantian philosophy should be modified in order to fit the results of subsequent scientific

investigations. The importance for Helmholtz of the law of causality is presented, and an attempt is made to relate it to such basic concepts as "force" and "cause," concepts which appear throughout his work. The dissertation concludes with a further attempt to characterize Helmholtz's philosophy by a presentation of his criticisms of Goethe's conception of the role of experiment and abstract concepts in science.

**LUTHER'S POLITICAL ETHICS:
AN INVESTIGATION OF HIS PRINCIPLES**

(Publication No. 2828)*

Herman Richard Klann, Ph.D.
Columbia University, 1951

This investigation of the principles of Luther's political ethics attempts to establish that they are rooted in his "theleological mysticism" which is for him the dynamic of all ethical activities of the Christian believer.

Hence, the view of a number of scholars, that the concept of a legally constituted corpus Christianum was determinative for Luther's political ethics, is rejected upon the conclusion of a representative analysis on the grounds that, limited as it is by Luther's conception of what constitutes the church, the concept is really of little positive value for the determination of his ethical principles. (Chapter I)

God's activity expresses itself in creation and preservation, judgment and salvation. This same work is marked in the orders of creation: the family, the social and political order, and the Christian Church. The "theleological mysticism" of the Christian is expressed in his participation of these orders of creation when he fulfills his particular calling which God assigns to him through other men. "Theleological mysticism" means the dynamic congruity of the Christian's will with that of the deity. (Chapter II)

The twenty-eight sections of analysis (Chapter III) dealing with a variety of Luther's writings from the period of 1519 to 1544 are intended to show, with some attention to the historical continuity of political developments, that his complete break with the medieval theological synthesis also involved the reconstitution of Christian ethics, including his political ethics. The analysis of practical problems and Luther's proposals for them suggests the conclusion

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that his fundamental ethical principle of "theleological mysticism" was applied with remarkable consistency.

Although Luther had strong leanings in the direction of preserving the political integrity of the Empire and in principle favored the development of a social and political settlement superior to that which existed in his time, he nevertheless accepted the contemporary territorial feudalism, chiefly because he could neither visualize a better social order nor imagine the means of introducing it.

Luther's view of the nature of the calling of the Christian man limited his own activity to theology and religious reform, and he rejected the role of a social and political reformer on this principle. However, as a theologian he had a great deal to say on the relation of Christian ethics to public office. Significantly he makes no room for an ethical dualism which restricts the validity of Christian ethics to the private life of a public official and confers a Machiavellian moral autonomy upon him in his official capacity.

The authority of secular government, according to Luther, was limited to the physical existence of its subjects. Any extension beyond this constituted tyranny which must be resisted passively by the subjects and actively by the lesser magistrate. The question of resistance rested both on constitutional law and the ethical requirement of the lesser magistrate to use his calling in the interest of those who could legitimately appeal to him for the redress of their injuries.

However, no amount of sympathetic understanding of Luther can conceal the conclusion that his concern to apply his fundamental principle of "theleological mysticism" to the issues of social and political justice was subordinated to his concern for a temporary social and political stability and order.

RELIGIOUS PHILOSOPHIES OF NATURAL SCIENTISTS:
A STUDY OF THE PUBLISHED CREDOS OF
TWENTIETH CENTURY AMERICANS

(Publication No. 2835)*

Edward LeRoy Long, Jr., Ph.D.
Columbia University, 1951

This study of the published credos of twentieth century American natural scientists deals systematically with the types of religious

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philosophy found in such writings. It is a qualitative study of the type of thought in each credo rather than a quantitative study of how many scientists fit any arbitrary definition of religiosity.

The credos fall into two major divisions, those which start from the scientific picture of the world and seek to derive a philosophy from it and those which start with a basic religious outlook and seek to reconcile it with scientific considerations. Among the first group the following types of philosophy, together with the individuals used to illustrate each, are covered: God as cosmic structure, in which the cosmic order of the universe is equated with the idea of god (Albert Einstein, David Starr Jordan, Arvid Reuterdaahl); three different emphases in Christian theism, including A) stress upon the idea of First cause, in which the order of nature is used as a proof of God's existence (Arthur Compton, Anthony Standen, William North Rice), B) stress upon the idea of growth as a clue to the understanding of God (Henry F. Osborn, Robert A. Millikan, Le Comte du Nouy), and C) stress upon the role of man in religion (Kirtley Mather, Carl Wallace Miller, Donald Dooley, E. G. Conklin); non-theistic outlooks of humanism and positivism (Vannevar Bush, Percy W. Bridgman, Philipp Frank); and enthusiasm for science and invention (Karl T. Compton, Charles Kettering).

In the second group the following types of thought are treated: The attempt to reconcile biblical statement with scientific facts, including A) creationism (E. Ralph Hooper, Frank L. Marsh, and a footnote on Louis Trenchard More, not himself a strict creationist), and B) the work of the contemporary group of scientists known as the American Scientific Affiliation; compartmentalism, in which scientific facts and religious tenets are held apart in strictly separate categories (Howard A. Kelly, Charles M. A. Stine); an attempted dialectical reconciliation between biblical faith and scientific knowledge (Frederick J. Pack, Charles de M. Sajous, Henry H. Lane, William Louis Poteat, and a Catholic variation in Hugh S. Taylor); and an anti-materialistic concept of religion (Igor I. Sikorsky). In an appendix (in order to emphasize the questionable scientific competence of its exponents) a variation of the attempt to reconcile biblical statement with scientific facts has been included under the title, "Deluge Geology" (George M. Price, Immanuel Velikovsky as a variation).

Brief conclusions suggest that credos of scientists include the same range of thought as those of other equally thoughtful groups, that no pattern can be found which clearly distinguishes a scientist's credo from what an individual of another vocational calling might write. From this the difficulty of drawing religious and metaphysical conclusions from scientific principles is pointed out, and the need for some dialectical unity between the two disciplines and ways of looking at life is suggested.

**DIONYSIUS ANDREAS FREHER: AN INQUIRY INTO THE
WORK OF A FUNDAMENTAL CONTRIBUTOR TO THE
PHILOSOPHIC TRADITION OF JACOB BOEHME**

(Publication No. 2844)*

Charles Arthur Muses, Ph.D.
Columbia University, 1951

This inquiry concerns Dionysius Freher (1649-1728), the most exhaustive expositor of Boehme to this date (1951) either on the continent or in England or America, and a main source for the more generally known and accessible William Law(d.1761).

The reason for Freher's comparative obscurity thus far is that his writings, with the exception of some few portions, have not been published, but still lie in MS. This work serves as an introduction to those writings and their study. These MSS, the bulk of which lie in the British Museum and in Dr. Williams' Library, London, are examined in the light of their having been studied in their entirety on microfilm; and the scheme of Freher's exposition of Boehme is set forth.

Boehme's own work divides itself fundamentally into 1) his analysis of evil and 2) his treatment of the seven properties or forms of nature, — the *Quellengeister*, which lie at the core of the Boehmian metaphysical analysis. Freher's commentary, consistently reflecting Boehme, is also subsumed under these subject heads, which contribute the contents of the third and fifth chapters respectively of the present work.

The first chapter deals with Freher's life, circle, influence and personality. Also, Freher's ancestry — including his relation to the Marquard and Paul Freher of already known reputation — is herein for the first time traced and established.

The second chapter is concerned with the somewhat complex history and vicissitudes of the Freher MSS. Two heretofore unknown Freher manuscripts are brought to light and identified, one of which is the biographically significant last will and testament of Freher, and the other, a collection of Freher material (PMS) containing several portions of his commentary on Boehme not to be found elsewhere.

The *Paradoxa*, *Emblemata*, *Aenigmatica*, *Hieroglyphica*, *De Uno*, *Puncto*, *Centro* (Brit. Mus. Add. MS 5789) is perhaps the most extraordinary and brilliant of all Freher's contributions. It is

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certainly the most concentrated; and the fourth chapter is reserved for a study of this work, which forms a natural transition from the third to the fifth chapter. Considerable importance is to be attached to the *Paradoxa* ... both intrinsically and by reason of its being the chef-d'oeuvre of Freher's diagrammatization and symbolization of Boehme. Hence a liberal sampling of photostatic copies of Freher's drawings is included, to which reference is made in the course of the text.

THREE CURRENT VIEWS OF VALUE

(Publication No. 2787)*

Sheldon Paul Peterfreund, Ph.D.
University of Pennsylvania, 1948

The Problem

The problem of this dissertation is to examine critically three current theories of value — Logical Positivism, Value Instrumentalism, and Value Realism — and their analyses of two vital issues in value theory: one, the status or function of value and value statements; two, the method of verifying value propositions.

The Current Types of Value Theory

1. Logical Positivism. The Positivists, in general contend that value statements have no cognitive meaning and must be regarded as mere expressions of emotions or feelings. Being emotive expressions, value sentences are like interjections, exclamations, optatives, and imperatives. They merely have the same grammatical form as factual propositions. Moreover, their linguistic analysis indicates that these value expressions cannot be verified as true or false, since they are not genuine propositions. In this school of thought, one finds Ayer, Stevenson, Carnap, and others.

2. Value Instrumentalism. The Instrumentalists maintain that the key to value problems is to be found in a genetic — functional approach, in contrast to a so-called static view. They argue that most axiologists give arbitrary definitions to value and value statements without taking into consideration the observable conditions in which these values originate and function. Instrumentalism demands concreteness in value matters. Desires, prizings, and other behavioral modes "become values" when they arise out of

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an existing need or lack and then lead to an integrated state of affairs. In this school of thought, one finds Dewey, Lpley, Geiger and others.

3. Value Realism. The Realists contend that the key to value problems lies in a theory of intrinsic value. Value Realism expresses the view that value is a unique property or quality attached, in some sense, to certain types of actions or objects and is independent of human behavior. Subjective reactions, whether they be in the form of desires, interests, or satisfactions, neither produce nor affect the presence of the value quality. The abiding presence of value in the object causes the individual to react favorably. In this school of thought, one finds Moore, Urban, Laird, and others.

Conclusions

This dissertation leads the writer to the following conclusions:

1. Future analysis of value statements, based upon semantical considerations, will be more sensitive to the common usages and functions of language than the current trends which investigate "one-and-only-one" meaning.

2. Future value theories will recognize value statements as warranted forms of empirical knowledge, employing empirical verificatory procedures.

3. The above-mentioned conclusions suggest the traditional dualism of "fact" and "value" will be given appropriate translations, so as to bridge the gap between factual and value matters.

PERSONALISM AND PRACTICAL JUDGMENT: A CRITIQUE OF CONCEPTIONS OF PERSONALITY HELD BY BORDEN PARKER BOWNE AND EDGAR SHEFFIELD BRIGHTMAN

(Publication No. 2850)*

Merritt Barnum Queen, Ph.D.
Columbia University, 1951

Although an adequate conception of personality is an essential instrument of civilization, there is no such conception widely accepted. Philosophical personalism, taking personality for its governing principle, may provide valuable insights for the gradual development of such a conception. Personalism may be defined most broadly as any belief in the reality of finite selves, or, more typically, as that form of idealism most closely identified with Borden

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Parker Bowne and with his student and critic, Edgar Sheffield Brightman. Their conceptions of personality are generally continuous and resemble at certain points the conceptions of methodological character formulated by four naturalists: R. Bruce Raup, George E. Axtelle, Kenneth D. Benne, and B. Othanel Smith.

Bowne conceives personality essentially as activity. Finite persons and the orderly, intelligible, impersonal universe depend upon an immanent Supreme Person. Personality is largely discrete, standing apart from, though influenced by, nature, society, ancestors, and the physical organism. Personality is characteristically active in thought and knowledge by the process of "transcendental empiricism," in which the conscious self works sensory experience over into intelligible concepts according to its own immanent categories and logical laws. These concepts constitute valid knowledge of the objective order by virtue of parallel laws inherent in thought and in thing. In establishing moral and religious beliefs, the practical reason takes precedence over the logical intellect, which is merely instrumental. Thus the mind is "an organic whole or vital interests and feelings" which expresses itself through the community as the supreme value and criterion of other values.

Brightman defines personality as "a complex but self-identifying, active, selective, feeling, sensing, developing experience, which remembers its past (in part), plans for its future, interacts with its subconscious processes, its bodily organism, and its natural and social environment, and is able to judge and guide itself and its objects by rational and ideal standards." Both knowledge and belief are to be tested by coherent reason, which is consistent, systematic, inclusive, analytic, synoptic, active, open to alternatives, critical, and decisive. Both personalistic views seem weak in not sufficiently recognizing some functions of the subconscious, the unconscious, the body, and the environment as aspects of personality. Their main strength lies in their conception of the methodological dimension of personality.

Raup, Axtelle, Benne and Smith, in attempting to develop a methodology for practical or moral judgments, find the judger's character and community orientation the most crucial and strategic components of the judgmental situation. The person is an emergent in the biological-community-cultural matrix, is constituted by the funded meanings of all his previous experiences, and always projects his character in action. The criterion of judgmental adequacy is the freely persuaded community, and the methodology requires judges who are sensitive, skilled and devoted to this community.

Similarities among the views of the indicated personalists and naturalists appear on the following points:

1. Personal experience is basic to all human activity.
2. Activity is a principal characteristic of personality.

3. Intelligence is inclusive of both rational and non-rational factors.
4. The freely persuaded community is a criterion of value judgment.
5. Imperative norms are characteristic expressions of personality.
6. A capacity for practical commitment is necessary methodological equipment of personality.
7. Adequate development in persons or characters is essential to the proposed methodologies. Thus two typical personalists and four naturalists start from opposite poles, consider some of the same data, cover similar ground in their investigations and interpretations, and emerge with certain striking similarities in their conceptions of personality at the point of method in value or moral judgments. Therefore it is concluded that these points of concurrent thinking may be taken as most fruitful contributions to the gradual development of an adequate view of personality.

SOCIAL ETHICS IN MODERN HINDU THOUGHT

(Publication No. 2859)*

Roland Waldeck Scott, Ph.D.
Columbia University, 1951

The nature of Hindu religion and society and their relations with each other have been profoundly affected by modern ideas and institutions. The awakened Hindu has tried to dissociate the spiritual essence of Hinduism from many institutions with which for centuries it has been allied. India has experienced a revival of interest in those early forms of its thought and life which are suggested by the new moral demands on its society. Sanatan dharma, or the eternal way of life, is thought to be as vital as ever, despite some of its undesirable historical expressions. Hinduism is interpreted as being an intuitive experience which can be realized individually by its adherents under changed conditions of their religious and social existence. Such conditions have been due largely to the impact of Western political, economic, social and religious forces. Movements of renewal within Hinduism have embodied new social and moral urges which their leaders have understood in the light of experience. Consequently, the modern mind has thoughtfully adopted new religious and cultural values, and has chosen different social

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norms than those dictated by tradition. Our problem is to learn in what respect and to what degree an ethical reconstruction of the religion itself has taken place.

Two characteristics of India's social reconstruction have been decisive for Hinduism: the growth of the free individual and of the free nation. In liberating himself from tradition the individual found his principal activity in working for the formation of a democratic national society. From the early nineteenth century this moral individuality expressed itself largely through religious and social reform movements which laid the basis for a wider acceptance of their ideals in the national movements which followed. Political and economic nationalism became the major cause of change in Indian society. The ethic of nationalism was put in terms of human rights and duties. Hindu dharma did not suggest a democratic organization of society, nor provide the institutions necessary for it. The function of religion was to strengthen the individual's sense of duty toward society.

In directing nationalism along the way of satyagraha, M. K. Gandhi challenged the individual to seek for freedom in himself while working for it in the nation. This extraordinary effort succeeded in reaching the immediate goal of political independence, but failed ultimately because the Congress adopted it as a pragmatic policy, and not on the ground of Gandhi's absolute religious principles.

The necessity of finding a new moral view of life has been particularly revealed in India's economic crisis. A secularist ethic appeared in the effort to secure just and equal opportunities for all people, and it stood in contrast with the prevailing religious interpretations.

Two major problems arose in the course of adopting democratic standards. First, caste was progressively shown to be incompatible with the awareness of personal dignity and welfare. The religious solution of the crisis precipitated in the caste system was to resort to the theory of varna dharma, or social differentiation by individual nature. But this proved too theoretical to be relevant to a society based on equality and justice. The second problem arose in connection with the effort to secure release for Hindu women and girls from their ancient disabilities. The women made their claims as persons of equal value to men, and not on any inherent religious principle.

We can conclude that while modern social values provided the content of a new Hindu ethic, the religious form in which they were conveyed consisted of a vehicle of Hindu ideas and attitudes unchanging in spiritual aims. Yet the relation of the ethical and the spiritual spheres was always ambiguous, because the social values were not made essential to, nor integral with, the ultimate view of

Spiritual Reality. Thus, modern religious thought helped the Hindu during a revolutionary period, but it provided no inner religious source of the values regarded as essential to human welfare.

**DIDEROT AND DESCARTES: THE ROLE OF CARTESIAN
IDEAS IN THE GROWTH OF SCIENTIFIC NATURALISM
IN EIGHTEENTH-CENTURY FRANCE**

(Publication No. 2866)*

Aram Vartanian, Ph.D.
Columbia University, 1951

Descartes' thought was the principal source of the ideology common to Diderot, La Mettrie, D'Holbach, and Buffon. This latter may be described as scientific naturalism, for it was from the general problems of natural science that the philosophes derived their materialist conception of man and the universe. Descartes had first indicated the full scope that a philosophy of nature might have in the interpretation of moral values and in the realization of human progress. He had also been the first, by the virtues of his new method, to establish a close bond between scientific knowledge and the diverse intellectual interests of the average educated person. Building on this two-fold basis, Diderot and his colleagues elaborated a materialist ideology founded on the natural sciences and capable of shaping public opinion in a variety of fields towards the attainment of the goals of Enlightenment.

The *Traité du monde* of Descartes had contained the seeds of modern naturalism in its proposal to explain the origins of the cosmos and its organic contents from the mechanical properties of matter exclusively. The historical separation of the Cartesian physics from metaphysical dualism allowed the radical implications of the former to evolve freely, even if often clandestinely, in their own right. Having revitalized the corpuscular doctrine of classical Epicureanism, Cartesian science succeeded, by its greater theoretical breadth and position of dominance, in absorbing into itself the contemporaneous tradition of Gassendism. The current of naturalism flowing in France from Descartes down to the philosophes may be traced, in a concrete historical context, through various assertions and judgments of such figures as Bayle, de Villars, Fontenelle, Père Daniel, Jean Meslier, Terrasson, Pluche, Voltaire, Montesquieu, Maupertuis, de Maillet, and many others. In

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age of lumières, the Cartesian-inspired materialist science came into conflict with the Newtonian natural theology. Descartes' view of a world in the process of successive formation and dissolution by the inherent laws of matter and motion clashed with Newton's notion of an essentially static world contrived and manipulated by an Intelligence external to it. The advance of geologic and cosmogonic science as seen in the Telliamed and Buffon's Théorie de la terre stressed and vindicated the Cartesian conception, and justified the idea of a creative Nature fundamental to the materialism of Diderot and D'Holbach.

With the opposition between Newtonian teleology and Cartesian naturalism, the philosophes inherited also a polarity regarding scientific method: namely, the inductivist, experimentalist procedure of Bacon and Newton as against the aprioristic, deductive ideal of Cartesianism. Because the philosophes' materialism was based on a natural science which, like Descartes,' envisaged the world from a developmental standpoint and tried to deduce the phenomenal order from an initial definition of matter and its laws of motion, Diderot and his associates were obliged, much more than has hitherto been recognized, to conform to the Cartesian methodology which was, moreover, everywhere present in the intellectual atmosphere of France. Concerning specifically the roles in scientific inquiry of hypothesis, systematization, intuition, and imaginative speculation, Diderot and Buffon followed closely the example of Descartes which, in turn, they sought to synthesize with the antagonistic attitude of English experimentalism.

In the sphere particularly of biology, Descartes' idea of the beast-machine, evolving independently of metaphysical dualism like the rest of his physics, culminated eventually in La Mettrie's thesis of the man-machine. Historical documentation for this event may be found in the writings of such thinkers as Regius, Perrault, Regis, Guillaume Lamy, Bayle, Jean Meslier, Leibniz, Saint-Hyacinthe, Boureau-Deslandes, Maupertuis, and others. The extension of automatism to man made possible the consistent formulation by La Mettrie, Diderot, and D'Holbach of a materialist monism which attributed to the functioning of the corporeal mechanism all phenomena of sensibility, feeling, intelligence, and thought. In the vitalist discoveries and speculations of the 1740's, furthermore, the philosophes found substantiation of their claim that all organisms were, not merely mechanically self-moving, but self-forming as well by matter in motion alone, that is, by the intrinsic creativity of Nature as such. To fill in the broad outlines of Descartes' unfinished Monde, the theory of transformism was first framed as an explanation of how organic beings had evolved unfinalistically, along with the remainder of the cosmos, by purely naturalistic causes.

The scientific naturalism of Diderot, La Mettrie, Buffon, and D'Holbach was, in its composite character, essentially the means for asserting, against the repressive influence of traditionalism and dogmatism, the authority proper to physical science in its aim to elucidate, by its own principles and methods, the origins and constitution of things. Simultaneously, it sought to render such knowledge available, in so far as it applied, for the interpretation, evaluation and guidance of man's peculiar activities and destiny.

PHYSICS

THE DEPENDENCE OF PARAMAGNETIC NEUTRON SCATTERING ON COUPLING BETWEEN Mn^{++} IONS

(Publication No. 2795)*

Philip J. Bendt, Ph.D.
Columbia University, 1951

The theory of the scattering of neutrons by the interaction of the neutron's magnetic moment with uncoupled paramagnetic ions in a crystal was given by Halpern and Johnson,⁽³⁾ and confirmed by experiments by I. W. Ruderman⁽⁸⁾ at Columbia University. The magnetic scattering of neutrons from a crystal whose ion spins are rigidly locked in an antiferromagnetic array has been studied by C. G. Shull.⁽¹⁴⁾ Thus the two limiting cases of free ions and rigidly oriented ions have been examined.

The purpose of the present work is to give information about various effects influencing neutron scattering in the intermediate situation, where neighboring ion spins are neither completely free, nor rigidly locked. Three effects are prominent in the interpretation of the results:

1. A fraction of the final transition states, which would be available in the case of free ions, are energetically forbidden, because the neutron does not have enough energy to excite them.
2. The ionic form factor is more important in reducing inelastic scattering than in reducing elastic scattering (in the absence of coherence effects).
3. There is coherent scattering due to short range ordering of the ion spins.

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The experiment was done by scattering a collimated beam of slow neutrons by a thin sample, and detecting the neutrons scattered at mean angles of 18° and 33° , and also detecting the transmitted neutrons. Using the Columbia University Neutron Velocity Selector, the neutron scattering was observed for a series of neutron wavelengths between 0.6 and 5.5 angstroms. Two samples were used, MnO and MnF_2 . The coupling constant J for MnO is about 5 times as large as for MnF_2 . The effective coupling between Mn^{++} ions was further varied by making measurements at a series of sample temperatures between 107°K . and 610°K . The experimental results are given on graphs of scattering cross section versus q_0 , where $q_0 = 2k_0 \sin \Theta/2$, and $\hbar k_0$ is the initial neutron momentum and Θ is the scattering angle.

The following results were obtained for MnF_2 :

1. The root-mean-square neutron energy change with inelastic scattering, $\Delta W_{r.m.s.}$, which is related to the spread of energy levels of the ion spin lattice in MnF_2 , was evaluated for three temperatures as follows:

| | | | |
|---------------------|-----------------------|-----------------------|-----------------------|
| Temperature: | 610°K . | 300°K . | 126°K . |
| $\Delta W_{r.m.s.}$ | 0.0020 ev | 0.00285 ev | 0.004-0.005 ev |

2. It was found that the inelastic loss of transition states reduces the neutron scattering at the two angles 18° and 33° by the same amount at corresponding neutron energies.

3. The 18° curve at 610°K . confirms the derivation of paramagnetic scattering by Halpern and Johnson, and gives an experimental determination of the uncoupled ion form factor in MnF_2 .

4. Short range order effects are not observable at 610°K . or at 300°K ., but do affect the scattering to the extent of 1 to 1.5 barns at 126°K . Also, the short range order effects are three to five times smaller than predicted by Slotnick's theory, using a value of the exchange coupling constant J calculated by the theory of Van Vleck.⁽⁵⁾

Measurements on MnO yielded the following results:

1. The temperature constant Δ in the Weiss-Curie law is found to be more significant than the Curie Point Temperature T_C for indicating the size of coupling effects.

2. The curves for MnO at 300°K . indicate the basic paramagnetic scattering cross section, which is 21.2 barns for MnF_2 , is about 3.3 barns less for MnO. This may be explained by assigning a weight in the total wave function to a state in which a 2p electron from O^{--} has gone into the 3d shell of Mn^{++} , thereby reducing the number of paramagnetic electrons on Mn^{++} .

3. The inelastic effects in MnO are found to be smaller than predicted by the Van Vleck theory.

4. There is evidence that the form factor for inelastic scattering raises the scattering cross section in the region $q_0 < 1.1\text{\AA}^{-1}$. This is due to modification of the ionic form factor by coherence effects.

5. The r.m.s. neutron energy change, $\Delta W_{\text{r.m.s.}}$, was evaluated roughly for 300°K. , and equals about 0.008 ev.

6. The coherent effects are found to increase with decreasing temperature. The range of spin order in the crystal lattice is given roughly by d/α , where d is the crystal cell dimension, and α is a parameter used in the calculations on short range order. The value of α for three temperatures is estimated to be:

| | | | |
|---------------------|----------------------|----------------------|----------------------|
| Temperature: | 300°K. | 180°K. | 133°K. |
| Value of α : | 3 | 2.2 | 1.8 |

These values indicate the range of ordering is quite small, and therefore a large change in ordering takes place near or at the Curie Point Temperature, which is 122°K.

7. The (1,1,1) magnetic reflection for complete antiferromagnetic locking of the spins has been observed at 107°K. , and confirms that magnetic cell dimensions are double the chemical cell dimensions. The area under the curves indicates the quantity of scattering is consistent with 4 antiferromagnetic sublattices and long range order.

A STUDY OF THE ELECTRICAL PROPERTIES OF POROUS SEMICONDUCTORS

(Publication No. 2883)*

Eugene Benjamin Hensley, Ph. D.
University of Missouri, 1951

Theories for the thermionic emission, conductivity and thermoelectric power for porous aggregates of semiconductors are examined with particular reference to oxide coated cathodes.

First, the theory of semiconductors as applied to single crystals is critically reviewed. A unified representation of this theory in terms of a temperature dependent Fermi level is formulated in order to avoid unnecessary assumptions regarding the impurity centers. The significances of the slopes of the conventional Richardson plots and conductivity plots of experimental data are discussed.

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A quantitative analysis of the hypothesis that conduction is possible through the electron gas present in the interstices of a porous aggregate is presented on the basis of two models. The first of these models assumes that the pores may be represented by two infinite emitting surfaces with the electric field normal each. The second model represents the interstices as a hollow rectangular prism with one dimension extending to infinity and the dimension parallel with the electric field very long compared with the third. The effective conductivity of the aggregate is discussed in terms of a series-parallel combination of the pores and crystals.

A theory explaining the magnitude and temperature dependence of the thermoelectric power of a porous aggregate of semiconductor crystals is developed and discussed.

EXPERIMENTAL MEASUREMENTS ON BREMSSTRAHLUNG FROM 17 MEV ELECTRONS

(Publication No. 2717)*

Lawrence Herman Lanzl, Ph.D.
University of Illinois, 1951

Several measurements on bremsstrahlung produced by 17 Mev electrons from a betatron were made. The electrons were removed from the betatron by means of a peeler and then focussed with a magnetic lens.

I. Z Dependence of the Cross Section for Bremsstrahlung Production.

a. Cross section for upper portion of spectrum.

The Z dependence of the cross section for the production of high-energy quanta was determined by several methods, using copper threshold detectors whose activity, induced by the reaction $\text{Cu}^{63}(\gamma, n)$, was measured.

In one method, two stacks of thin foils, one composed of copper and the other, of alternate copper and gold foils, were irradiated with electrons. The activities in the copper foils were plotted as a function of foil position, giving nearly linear curves. Using the ratio of the slopes, one obtains the ratio of the bremsstrahlung cross sections of gold and copper.

Another method used a series of thin radiators with equal values of $N(Z^2 + Z)$, where N is the number of atoms/cm² and $Z = 4, 13, 29, 47$, and 79 . Here, the x-ray beam was cleared of electrons

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by a magnet before reaching the detectors which were large copper disks.

The results of these experiments indicated agreement within 1% with the Bethe-Heitler theory,¹ for the Z dependence of the bremsstrahlung cross section over the upper portion of the spectrum. Theoretically, the cross section due to electron-nuclear collisions varies as $Z^2S(Z)$, where $S(Z)$ is a screening factor which, for a copper detector, lowers the cross section by 2% for beryllium and 6% for gold, compared to the simple Z^2 dependence for an unscreened nucleus. Electron-electron radiative collisions were found to contribute $0.7 \pm .05$ times the radiation expected for electron-proton interactions. This factor was calculated to have the theoretical value 0.54 for a copper detector.

b. Cross section for total radiative energy loss.

The total radiation was measured with a wide-angle ion chamber, using the experimental setup and the targets of the last method above. It was found that the relative yield from a gold target is somewhat less than that from the low-Z elements. This discrepancy might be accounted for by improved screening corrections and more accurate consideration of the radiation from electron-electron impacts. The absolute cross sections are in rough agreement with theory.

II. Angular Distribution of Radiation Intensities.

The intrinsic distribution of bremsstrahlung intensities was measured by means of film and an ion chamber. The radiation was produced in 0.002" cellophane and a small amount of air, where multiple scattering of electrons is small. The electrons were again deflected magnetically from the x-ray beam. The results showed good agreement with Schiff's² form,

$$\frac{1}{\left[1 + \left(\frac{E}{N} \Theta\right)^2\right]^2}.$$

The angular distribution of radiation from foils of various thicknesses was measured with film, ion chamber, and copper detectors. The results could be represented by an expression similar to that of Lawson,³ using the above intrinsic width and the electron multiple scattering as given by Moliere.⁴

The central yield from gold as a function of target thickness was measured with a small ion chamber, and found to be in agreement with calculations in which the electron energy losses and the absorption of quanta are taken into account.

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NUCLEAR MAGNETIC RESONANCE IN HYDROGEN-METAL SYSTEMS

(Publication No. 2720)*

Richard Edwin Norberg, Ph.D.
University of Illinois, 1951

The nuclear magnetic resonance absorption signal is observed for hydrogen absorbed into palladium wire. Both steady state absorption and pulsed experiments are performed on samples consisting of .030" diameter palladium wires, loaded from a glow discharge to hydrogen concentrations (expressed as atom ratios $C = H/pd$) from $c = .2$ to $.8$. The resonance signal is due to those protons contained within the skin depth and is observed for samples either wound into the form of a coil or used as the terminating stub of a quarter wavelength coaxial transmission line. The observation of a dispersive shape for the resistive (or ordinarily absorptive) mode of the resonance signal and of certain anomalies in the T_1 data has led to the development of a theory of the resonance signal when the sample is a wire. Experimentally, the absorption line is found to be narrow (less than .1 gauss), indicating that the protons are in motion. The jumping of the protons among the interstitial potential wells is considered theoretically as a self diffusion process which limits the resonance linewidth. The temperature and concentration dependences of the linewidth and relaxation time T_1 indicate that the mutual interaction among the protons is the dominant magnetic interaction. T_1 and T_2 are both observed to increase with decreasing concentration, which apparently excludes the possibility that an interaction with the palladium d band electron vacancies determines either time. There is evidence for the existence of an appreciable broadening of the line over the width predicted by a simple theory of a proton liquid. The data probably all correspond to the phase of the alloy and indicate a constant diffusion coefficient for the interstitial protons between $C = .3$ and $.7$. For a typical sample of $C = .6$, $T_2 = 4$ millise. at room temperature and decreases exponentially with decreasing temperature to 1 millise. at 230° K. In the same temperature range, T_1 is observed to

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decrease from 30 to 17 millise. The resonant frequency is observed to be shifted with respect to that for the protons in water. At low hydrogen concentrations, the large bulk paramagnetic susceptibility of the palladium dominates the measured shifts. At high concentrations, such that the palladium susceptibility is negligible, there remains a small, temperature-independent, paramagnetic shift of .15 gauss in 7000. This shift is attributed to a very small interaction with the conduction electrons and is of the magnitude to be expected from inspection of the shifts reported for ordinary metallic nuclei of atomic number greater than one.

A STUDY OF THE LUMINESCENCE OF AND OPTICAL
ABSORPTION IN BARIUM OXIDE AS A
FUNCTION OF TEMPERATURE AND THERMIONIC ACTIVITY

(Publication No. 2903)*

Virgil Loomis Stout, Ph.D.
University of Missouri, 1951

The purpose of this investigation was to study luminescence of BaO in order to gain further knowledge of the basic electronic structure of the crystalline BaO cathode coating.

In the course of this work two tubes were constructed for luminescence measurements. The first of these used a conventional cylindrical cathode as the target to be irradiated with electrons. The second tube had the nickel cathode base metal mounted upon a Kovar cub so that the cathode could be cooled to below room temperature or heated to make thermionic emission measurements.

Initially photographic plates served as a medium for recording data. Because of the long tedious work required by heterochromatic film calibration, a recording spectrophotometer was constructed. The spectrophotometer was adapted so that absorption and luminescence measurements could be readily made. This instrument and its component parts are discussed in detail.

Absorption measurements were made upon evaporated BaO films and upon a BaO coating in a specially designed tube that permitted one to evaporate, heat, pass current through, and make absorption measurements on the same sample. Absorption measurements were made in the spectral range of $250 \text{ m}\mu$ to 2.5μ .

The BaO used for all measurements was prepared by heating BaCO_3 in a vacuum. BaCO_3 from two sources was used in this

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study; two types of nickel served as cathode base metals. Part of the BaCO_3 was prepared in our laboratory and the other part, ultra pure BaCO_3 , was prepared by Mallinckrodt. The base metals used were pure nickel and nickel containing a tungsten impurity.

Cathodoluminescence was studied as a function of thermionic activation and temperature. Seven different peaks were observed in the luminescent spectrum. Three of these bands were found to change in intensity when the samples' thermionic activity was varied. A band at $345 \text{ m}\mu$ increased in intensity with increasing activation while bands at 465 and $550 \text{ m}\mu$'s became less intense. The luminescent intensity of the 465 and $550 \text{ m}\mu$ bands was found to be more susceptible to temperature changes than the $345 \text{ m}\mu$ band.

Using conductivity, F center, and optical absorption data, that have been observed by others on BaO crystals, and two fluorescent mechanisms, the bands that vary with thermionic activation can be attributed to certain electron transitions that are believed to occur in F center type of defects and between an F center type of defects and holes in the upper filled band. Two types of defects are considered: oxygen ion voids and barium ion voids.

As the length of the mean free path for a hole will directly influence the mechanism proposed to cause the fluorescence of the $345 \text{ m}\mu$ band, it was possible to check the temperature dependence of the intensity emitted in the $345 \text{ m}\mu$ band against the temperature of the crystal by means of an equation developed by Fröhlich and Mott for the mean free path for holes and electrons in a crystal. This check shows the peak intensity of this band to vary as

$$\exp. \left[\frac{\Theta}{T} \right].$$

As a result of this work, one can verify certain already attained values for the energy model of a BaO crystal and make estimates of other values.

POLITICAL SCIENCE

CONGRESSIONAL BEHAVIOR AT CONSTITUTIONAL FRONTIERS FROM 1906, THE BEVERIDGE CHILD-LABOR BILL, TO 1938, THE FAIR LABOR STANDARDS ACT

(Publication No. 2827)*

Thomas George Karis, Ph.D.
Columbia University, 1951

This is a case study in the legislative process at times when it has been complicated by questions of constitutionality and the prospect of judicial review. The inquiry is not into the constitutionality of legislation but into the "mental operations" — and actions — of Congress and the President. An attempt is made, with reference to one slice of legislative history, to measure the validity of some common statements about Congress and the Supreme Court. It is said, for example, that the Court has deterred or at least delayed Congress from acting and that the Court "tends to stabilize and rationalize the legislative judgment" (Cardozo).

There was delay in the achievement of national child-labor standards as a result of adverse judicial decisions and Congress' proposal of the Child-Labor Amendment. But this study finds that in the movement of three decades culminating with the Fair Labor Standards Act of 1938, the Court was not of crucial importance as a prior restraint on the enactment of legislation. No likelihood is seen that in the absence of judicial review Congress would have spoken recklessly or "run riot."

The substance of the policy of national labor standards is of incidental interest only. Legislative movement from 1906, the date of the first bill for national regulation of child labor, to the Act of 1938 has been selected for examination because it is to be observed in the context of a judicial development that moved full circle — from the Lottery Case of 1903, which seemed to hold the door of the commerce power open for the 1906 bill, via *Hammer v. Dagenhart* in 1918, which held void the first Child-Labor Act, to the *Darby* case in 1941, which upheld the Fair Labor Standards Act and explicitly overruled *Hammer v. Dagenhart* — a chapter in constitutional history that is today closed.

Certain stages of the legislative history have received intensive attention, and other stages have been ignored. Congressional discussion in 1906-1907 of proposals to prohibit interstate shipment of child-made goods was episodic and premature but dramatic

* Microfilm copy of complete manuscript of 437 pages, \$5.46.
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and of interest. The years from 1908 to 1913 are skipped over. A second abortive attempt, in 1914-1915, and the passage of the first Child-Labor Act in 1916 are described at length. One chapter describes the Congressional reaction to *Hammer v. Dagenhart* and the enactment of a child-labor tax in 1919, but no chapter has been written describing the reaction to the Court's decision holding the tax void or the proposal of a Child-Labor Amendment.

Attention is shifted from 1919 to December 1932, when the first serious challenge to the *Dagenhart* case appeared in the Black-Connery thirty-hour week bills. These bills did not include child-labor standards; and, since this study is more concerned with the fate of *Hammer v. Dagenhart* than of child laborers, the inquiry into the New Deal period has been broadened to include the movement toward maximum-hour and minimum-wage as well as child-labor standards. Legislative activity from 1932 to 1938 is discussed as a continuous narrative with special reference to the Black-Connery bills, the National Industrial Recovery Act, the reaction to the Court's decisions, movement on various avenues of national power, and attempts to reach the objective indirectly or through constitutional amendment or action to reduce the threat of the Court.

What has been taken to be of most interest is what public men have said publicly and what, finally, they have done. Therefore, the inquiry is for the most part into the usual and readily available sources of legislative history. No psychoanalysis is attempted.

THE UNITED NATIONS AND ARAB REFUGEE RELIEF
1948-1950: A CASE STUDY IN INTERNATIONAL
ORGANIZATION AND ADMINISTRATION

(Publication No. 2853)*

Channing Bulfinch Richardson, Ph.D.
Columbia University, 1951

The book is a description and analysis of the manner in which the United Nations met the problems posed by the flight of 940,000 Arabs from Palestine in 1948. It is the story of a unique refugee relief operation carried out for the United Nations by three non-governmental organizations, the League of Red Cross Societies, the International Committee of the Red Cross and the American Friends Service Committee (Quakers). The study opens with a

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description of the flight of the Arabs during the early months of 1948 and closes on May 1, 1950. On this date the United Nations ceased its purely relief operations and began a new effort to integrate the refugees into the four Arab nations into which they had fled. Since the major organizational device used by the United Nations to meet relief problems was the "United Nations Relief for Palestine Refugees" and its affiliated three non-governmental organizations, the book is primarily concerned with the operations and problems of these groups.

The plight of the Arab refugees fleeing from Palestine came to the attention of the United Nations Mediator, Count Folke Bernadotte late in May, 1948. His efforts to aid them culminated in an interim organization being established. Entitled the "Disaster Relief Project," it functioned as a coordinating unit and attempted to bring order out of chaos of the refugee situation. Technically a part of the Mediator's staff, it suffered from total lack of funds and authority to control the work of the many private agencies interested in aiding the refugees.

As the hardships of the uprooted people increased, the General Assembly of the United Nations established a new organization to speed relief measures. This ad hoc group, known as U.N.R.P.R., was designed to bring emergency food and medical services to the Middle East and to be dissolved when the refugees returned to their homes in Palestine. Since they were unable to do this, the agency's life was extended until May 1, 1950. With no task but to bring relief services, it was not concerned with finding political solutions to the refugee problem and made every effort to keep clear of the political issues surrounding its tasks.

The unique feature of U.N.R.P.R. was its use of the three non-governmental organizations as its operating arms. These three groups enjoyed almost complete autonomy in the field as the result of agreements signed between them and the United Nations. Each managed a complete refugee relief program. The League of Red Cross Societies operated in Lebanon, Syria and Jordan; the International Committee of the Red Cross was in Israel and Arab Palestine and the Quakers were in the Gaza strip. The book describes in detail the programs of each, including rations, supply and transport problems, medical and welfare projects. It also describes the activities of the Specialized Agencies of the U. N. and other groups.

Considerable attention is given two of the major problems of U.N.R.P.R. — those of finance and relations with governments. The reliance upon voluntary governmental contributions is analyzed critically. The problems of working closely with the Arab governments of the Middle East are also described.

An appraisal of the entire refugee operation is included, with particular emphasis on lessons to be learned for any future refugee

situation in which the United Nations may become involved. A chronology, several appendices relating to finances and a bibliography conclude the work.

PSYCHOLOGY

RELATIONSHIP OF SZONDI PICTURE PREFERENCES TO PERSONALITY

(Publication No. 2805)*

Henry Philip David, Ph.D.
Columbia University, 1951

The Szondi test was described as a new projective technique, designed to aid in clinical diagnosis. It consists of 48 pictures of mental patients, divided into six sets of eight pictures each. Within every set there is one picture representing each of the following eight syndromes, or Szondi factors: homosexual (h), sadist (s), epileptic (e), hysteric (hy), catatonic-schizophrenic (k), paranoid-schizophrenic (p), manic-depressive depressive (d), and manic-depressive manic (m). The subject is asked to select the two pictures he likes most and the two he dislikes most within every set. One of the purposes of the thesis was to test empirically some of the assertions made for the Szondi.

The test was individually administered six times to each of 100 idiopathic epileptics and 100 homosexuals. All of the epileptics had long histories of seizures, were under anti-convulsive drug treatment, and were considered non-homosexual. All the homosexuals fulfilled the basic criterion of having sexual histories either exclusively homosexual in nature or very predominantly so. None were epileptic. All the subjects were single white males between the ages of 18 and 49, non-psychotic, and non-deteriorated intellectually. They had been selected for study because their diagnoses were relatively well-established in comparison to Szondi's other disease entities.

The general question to be asked was whether the Szondi test could differentiate, in terms of Szondi theory, between two clearly different clinical groups.

In summary, the findings were as follows:

1. Differences in factorial directions were noted between the two groups but were not identical for Administration I and

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Administration VI. In some instances the findings were contrary to theoretical expectations and could not have been predicted.

2. None of the 28 diagnostic indicators, or "signs," postulated by Szondi or Deri for epilepsy or homosexuality, either singly or in pattern combination, discriminated between the two groups on both Administration I and Administration VI. Differences observed were not always in the direction expected by theory and did not necessarily persist from Administration I to Administration VI.

3. Although differences among the several factors were noted in regard to total amount and specific kinds of changes in factorial directions over all six administrations, these differences were largely the same for both groups. Neither total amount nor the specific kinds of changes in factorial directions were effective in discriminating the two groups.

4. Of the 48 individual Szondi pictures, 21 discriminated significantly between epileptics and homosexuals on Administration I while 18 performed similarly on Administration VI. Only 12 pictures, however, differentiated significantly between the groups on both administrations.

5. A comparison of individual picture preferences, Liked and Disliked, of each of the 48 Szondi pictures between Administrations I and VI for all subjects revealed fairly consistent choice reactions.

On the basis of the findings reported, the following implications were considered:

1. The Szondi test, as presently constituted, is not a valid clinical instrument, at least in so far as it fails to discriminate between the idiopathic epileptics and overt homosexuals studied.

2. The Szondi factorial scoring system, crudely and mechanistically constructed, does not reflect adequately the individual picture preferences. Interpretations based upon the system and its postulated signs cannot be recommended.

3. If used at all, the Szondi should be utilized only in conjunction with other clinical instruments of more demonstrated validity.

A COMPARISON OF PROCEDURES
FOR ANALYZING AN ATTITUDE QUESTIONNAIRE
FOR GERMAN PRISONERS OF WAR

(Publication No. 2814)*

Charles Penn Gershenson, Ph.D.
Columbia University, 1951

The basic purpose of this study was to compare the techniques of factor analysis and latent structure analysis using a common set of variables. The German Attitude Scale, a scale consisting of 100 attitude items measuring belief in National Socialism and a ten item truth scale, was used for these analyses. The attitude scale was divided into seven sub-scales: Family, Government, War, Ethics, Race, Future of Germany, and Projection.

The problems of the study were to determine the dimensionality of the attitude scale using a factor analysis of scores and one of items and to determine the number of homogeneous groups that the scale could discriminate.

The scale was administered in German to approximately 5,000 German Prisoners of War who were detained in the United States. Two sub-samples were selected from this pool: 766 cases for the factor analysis of scores and 1,000 cases for the latent structure and item factor analysis. For both samples, only those cases with complete information were selected.

A factor analysis of the seven sub-scales and truth scores was computed. Three factors were extracted and rotated for meaningfulness. The first factor was identified as an acceptance of and belief in authoritarianism. This authoritarianism encompasses more than National Socialism as it includes the authoritarian German family structure which existed long before the rise of Hitler. The second factor was one of truthfulness. Belief in National Socialism was the third and final factor.

For the latent structure analysis, a set of forty-two items from the scale were used. The resulting analysis revealed the existence of four latent classes that could be identified in terms of three continua. These classes were: 1) fanatical believers in National Socialism who lied consistently and were stupid; 2) believers in National Socialism who also lied consistently but who were a little more intelligent; 3) a more intelligent suspected group that indicated little belief in National Socialism but lied on four of the six truth

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items; and 4) the most intelligent group that indicated little belief in National Socialism but lied on half of the truth items. The proportion of the total sample in each group was respectively 18%, 22%, 55%, and 5%.

A factor analysis was computed for the covariance matrix of the same forty-two items that were used in the latent structure analysis. Three factors were extracted and readily identified. The first factor was a proneness to making mistakes in responding to ambiguous items, negative items; the second factor was a proneness to respond correctly to simply written items, positive items; and the third factor was a proneness for lying when responding to truth items.

The dimensionality of the matrix remains the same whether scores or their component items are used. While the dimensionality may remain the same the interpretation does not. The identity of the factors may change completely when items are used rather than scores.

The latent structure analysis of the scale did isolate four groups that may be categorized as safe, suspected, and unsafe German Prisoners of War. It was necessary to postulate three underlying continua to account for the three groups. Two of the classes differed slightly as to their unsafeness.

Two most important problems for latent structure analysis are the development of sampling distributions and a general solution for the continuous model. With the development of a continuous model factor analysis will turn out to be a special case of latent structure analysis.

AN INVESTIGATION INTO THE NATURE AND INTENSITY
OF THE ANXIETY EXPERIENCED BY THREE CLINICAL
GROUPS OF CHILDREN AT TWO DIFFERENT AGE LEVELS
AND OF THE DEFENSES THEY DEVELOP
AGAINST THEIR ANXIETY

(Publication No. 2763)*

Florence Cohn Halpern, Ph.D.
New York University, 1951

The Problem

The purpose of this investigation was to examine and evaluate, by means of the Rorschach test, the frequency of the anxiety

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experienced by normal, neurotic and schizophrenic children at two different age levels, and the ways in which this anxiety expressed itself; and to examine the defenses these different groups of children employed in their efforts to deal with their anxiety. The findings of this investigation were also evaluated for their diagnostic significance.

The Method

The Rorschach records of 180 children, 60 normals, 60 neurotics and 60 schizophrenics, divided into two age groups, one going from 6 years 6 months to 7 years 6 months, the other from 9 years 6 months to 10 years 6 months, were examined for evidences of anxiety and defenses against anxiety.

Evidences of anxiety were subsumed under three main headings: evidences of loss of control, of inability to meet situations adequately and of feelings of insufficiency. The defenses considered were constrictive control, flight from anxiety-provoking situations, projection, a combination of any of these defenses and the absence of any of these defenses.

The frequency of occurrence of each type of anxiety indicator for each clinical and age group was established. The data were then submitted to a variance analysis to determine whether there was any relationship between the frequency with which anxiety indicators appeared in the different experimental groups and the clinical diagnosis and/or the age of the subject, and between the type of anxiety indicator manifested and the clinical diagnosis and/or the age of the subject. Where such relationships were demonstrated, the probability of their occurrence was determined on the basis of *t* scores.

The number of subjects resorting to each of the mechanisms of defense and the reliability of the difference in frequency of occurrence of the different mechanisms was calculated for the three clinical groups and the two age groups. A chi-square test was applied to determine whether there was any relationship between the type of defense used and the clinical diagnosis and the age of the subject.

On the basis of the experimental findings, certain criteria were set-up as being significant for each of the six groups investigated. The effectiveness of these data for diagnostic purposes was tested by using it to classify records where diagnosis was unknown to the experimenter.

The Results

The results of this study indicated that the schizophrenic children gave reliably more indicators of anxiety than did the normal and neurotic subjects, while the frequency of anxiety indicators, per se, did not distinguish between the normal and the neurotic groups.

The frequency with which anxiety indicators were given was not affected by age but the age factor made a difference in the way this anxiety was expressed, the younger group showing it more frequently through loss of control, the older group through inability to meet situations adequately.

The normal and neurotic groups showed inability to meet situations adequately, that is, showed forms of "shock reactions," more frequently than other manifestations of anxiety, while the schizophrenics manifested loss of control most often.

Constrictive control and absence of any of the defenses studied here were the categories which contained the largest number of subjects. There was no significant relationship either between the clinical diagnosis or the age of the subject and the type of defense mechanism employed.

The criteria set up on the basis of the experimental findings were found to be effective as diagnostic aids on a better than chance basis.

**THE PROJECTION OF ASSAULTIVE AGGRESSION
IN THE HUMAN FIGURE DRAWINGS OF
ADULT MALE NEGRO OFFENDERS:
A STUDY OF INMATES CONVICTED OF HOMICIDE OR
ASSAULT BY MEANS OF HUMAN FIGURE DRAWINGS,
RORSCHACH, THEMATIC APPERCEPTION TEST, AND SZONDI**

(Publication No. 2767)*

Joseph Katz, Ph.D.
New York University, 1951

The investigation was undertaken to determine whether assaultive aggression is projected into the drawings of human figures, the nature of this projection, and its psychological interpretations. The experimental group consisted of 52 adult male Negro offenders of sub-normal intelligence, convicted of assaults or homicide and who were incarcerated for their offenses. The control group consisted of a similar number of matched subjects with no history of assaultive behavior. The study also sought to provide dynamic understanding of assaultive aggression by means of case histories, and supplementary projective techniques administered to the assaultive group; namely, the Rorschach, Thematic Apperception Test, and Szondi.

* Microfilm copy of complete manuscript of 206 pages, \$2.58. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-507.

The investigation was based on Schilder's assumption¹ that the spontaneous drawing that a subject creates of a human figure, is a projection of the body image and relates most directly to his inner feelings and tensions. Succeeding studies have been concerned with human figure drawings as a basis for diagnosis and intelligence.

Each male and female drawing of the groups under study was analyzed according to 32 categories of drawing characteristics, derived in part from Machover's² empirically derived drawing features denoting aggression, and in part from a formal analysis of the placement, size, stance, and type of lines of the drawings.

The experimental and control groups were split into halves by random means. Each dichotomous drawing detail was tested for discriminatory value between both halves of the groups by the chi-square formula. The final twelve differentiating items which were significant below the ten per cent level of the first halves, and below the five per cent level of the second halves, were the following: eyes "piercing" and reinforced, large fingers, arms reinforced, fingers reinforced, stick-like fingers, legs reinforced, legs thrust wide, feet reinforced, combination of firm, light, and heavy lines, and for the male drawings only - large arms, hair reinforced, and large legs. Interpretations of these drawing features were presented, based upon the functions inherent within the particular organs or drawing features themselves, the case histories, differences in the drawings of the control subjects, and the results of the other projective tests utilized.

The results substantiate the first hypothesis that a basic structural difference exists between the groups under study, as a result of differences in bodily tensions and their discharge. The second hypothesis is substantiated in part only; namely, that these tensions are projected in a specific manner in those body organs which are most directly concerned with and necessary for the discharge of assaultive tension.

No one drawing feature in itself can identify an assaultive subject, but a combination of at least nine of the total possible twelve significant discriminative features in a drawing of a male, and a combination of at least eight out of a total possible nine discriminative features in a drawing of a female does differentiate the assaultive individuals.

The empirical observations of Machover, denoting aggression in human figure drawings, are in agreement with five of the

1. Paul Schilder, The Image and Appearance of the Human Body. New York: International Universities Press, Inc., 1935.
2. Karen Machover, Personality Projection in the Drawing of the Human Figure. Springfield, Illinois: Charles C. Thomas, 1949.

differentiating features of this study, but twelve other drawing features which she suggests are indicative of aggression, are not substantiated in the present groups under study.

These results are most readily applicable to adult male Negro offenders of retarded intelligence who were reared in the South. Similar studies are necessary with other racial and clinical groups if the findings of the present study are to hold up, and if they are to contribute to a more dynamic understanding of assaultive aggression.

PSYCHOMETRIC EVALUATION OF RORSCHACH RECORDS IN BRAIN-OPERATED PATIENTS

(Publication No. 2836)*

Raymond Joseph McCall, Ph. D.
Columbia University, 1951

Background

Negative results of original Rorschach study of Greystone I patients except for differences in reaction time.

Hypothesis

If the Rorschach responses which did not upon traditional analysis differentiate significantly between improved and unimproved or operated and unoperated patients, are psychometrically graded by means of rating scales (Zubin's method), some significant differences should appear pre-operatively and/or post-operatively between the records of the eventually improved and those of unimproved patients. Some differences should also appear between the post-operative responses of operated and control patients, reflecting the effects of the operation itself.

Method

1. Rating scales, based on the latest edition of the Zubin manual, were applied to each Rorschach response of each subject in the original population of 34 chronic psychotics. These scales essay to measure not only the "formal" indicators, stressed by Beck, Klopfer, et al, and perceptual differences analyzed by various theorists, but also to assess many aspects of content which Rorschach himself regarded as relatively unimportant, but to which research specialists like Burt in England as well as many clinicians in this country attach special value.

2. In order to enhance the dichotomy between improved and unimproved subjects and to remove possibly unreliable data, the population finally analyzed was reduced to 27 subjects, 15 of whom had

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undergone a brain operation and 12 of whom were matched controls. Twelve of these 27 patients were regarded psychiatrically as unquestionably improved, having been out of the hospital for the better part of three and one-half years, while 15 of 27 showed no improvement and were still hospitalized.

3. Mean differences on these scales for the 12 improved and the 15 unimproved cases were analyzed statistically by the method of variance for the pre-operative records, and by the method of covariance for the post-operative records. In the post-operative records, too, the search was for prognostic indicators of eventual outcome rather than for diagnostic signs.

4. Post-operative differences between operated and control patients were analyzed by the method of covariance with a view to detecting possible effects of the operation itself.

5. Certain factors corresponding to the ratios W:M, M:C, and m:c were also analyzed (covariance method) on the change that these might reveal significant differences between improved and unimproved or operated and control patients which did not appear from the components of these ratios taken separately.

Results

1. Of 35 scales employed 5 showed significant differences (.05 or better) pre-operatively between the eventually improved and unimproved cases. These scales were Surface Color, Dehumanization, Ascendancy-Submission, Plant Importance, and Popularity. The cases destined for improvement also showed a significantly longer reaction time to the colored cards and to the cards generally than did the unimproved cases. Of the 5 significant scales only Popularity and Surface Color have any resemblance to traditionally "important" scoring categories, and even these are applied in a very different fashion from their analogues in ordinary scoring.

2. Only one significant difference appeared between the pre-operative records of operated and control subjects. Since the probability of 1/35 scales proving "significant" by chance is .83 we can regard the operated and control subjects as originally well matched.

3. Two scales, Ascendancy-Submission and Plant Importance, which had differentiated improved from unimproved cases pre-operatively also differentiated these cases post-operatively, and at a high level of significance (.001 and .01 respectively).

4. Three of the five scales which had differentiated pre-operatively between improved and unimproved cases (Ascendancy-Submission, Dehumanization, and Popularity) showed significant differences (.05, .01, .02 respectively) post-operatively between operated and control patients. The Human Importance scale also differentiated (.02 level) in this regard.

5. Scales based on traditional "formal" scoring categories did not differentiate significantly between operated and control or improved and unimproved patients pre-operatively or post-operatively.

The factor corresponding to the W:M ratio, however, did differentiate (.01 level) post-operatively between improved and unimproved cases, and in this respect only.

6. In general, the psychometric scaling technique revealed differences not evident from the traditional scoring methods. The direction of these differences is not particularly consistent from first to second testing of the improved cases, but this very inconsistency of performance may be one key to good prognosis under psychosurgery.

7. The scales which revealed the greatest differential sensitivity deal with the content of responses, particularly human content. It is suggested that greater attention might be paid by clinicians to these content factors rather than to refinements of the so-called "formal" signs.

8. The psychometric scaling of response content suggests several hypothetical "interpretations" which might guide future investigations of prognostic signs.

THE PERSONALITY STRUCTURE OF CHILDREN WITH READING DISABILITIES AS COMPARED WITH CHILDREN PRESENTING OTHER CLINICAL PROBLEMS

(Publication No. 2782)*

Max Siegel, Ph.D.
New York University, 1951

The purpose of this investigation was to study the range of personality structures in forty-two known cases of reading disability and to compare these personalities with those of forty-two boys who read adequately but presented other clinical problems. The two groups were compared for significant statistical differences with respect to case history, mental test, school achievement test, and Rorschach Test variables. The quantitative findings were elaborated and interpreted, and the data subjected to clinical analysis.

There were no significant differences between the two groups with regard to educational and developmental history data. The family constellations in both groups were physically intact but emotionally disintegrated, with a preponderance of parental maladjustments which seemed to be associated with rejecting attitudes toward the children.

Both groups ranked at a high average intellectual level, with

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marked variability in test performance noted. The Clinical Group showed significantly better achievement in spelling and arithmetic, as well as in reading.

The Rorschach records of both groups suggested considerable anxiety, with feelings of insecurity, inadequacy and conflict. Five experienced Rorschach examiners were unable to differentiate the records of the two groups, and indicated their clinical impressions that both groups were composed of emotionally disturbed children. Neither group evidenced primarily introversive or extratensive tendencies, and neither group showed a particular type of personality maladjustment.

The findings suggested that the poor readers in this study were actually a clinical population characterized by neurotic anxiety and internalized conflict. No single personality pattern was characteristic of the Reading Group, which showed a range of disturbances such as might be found in any group of emotionally disturbed children. In so far as this study was concerned, the data indicated that relationships within the family were important factors in the emotional reactions of the children in both groups. It appeared that when home and family maladjustments were present, the result might be reading disability, enuresis, stuttering or any combination of clinical problems. It was observed that the emotional disturbance which pervaded both groups served to aid some children in learning to read and to interfere with the learning of others.

The data obtained in this study emphasized the importance of home and family relationships to the educational adjustment of the child, and stressed the individuality of the personality structure of children with reading disabilities. Suggestions for a possible treatment program were implicit in the total findings, in terms of the need for permissiveness, warmth, acceptance, and a non-critical approach to children as deeply fearful as these.

**THE PERSONALITY OF THE PSYCHOGENIC HARD OF
HEARING ADULT: A COMPARATIVE STUDY OF THE
PERSONALITY CHARACTERISTICS OF PSYCHOGENIC HARD
OF HEARING ADULTS THROUGH THE MEDIA OF OBJECTIVE
AND PROJECTIVE PSYCHOLOGICAL PROCEDURES**

(Publication No. 2784)*

Walter Harold Slote, Ph.D.
New York University, 1951

This study constituted an investigation into the personality of the psychogenic hard of hearing adult. The experimental group was composed of twenty psychogenic acoustically handicapped veterans and the control group was composed of an equal number of organic acoustically handicapped veterans. The problem was designed to investigate whether identifiable personality characteristics existed for the experimental population and whether these could be differentiated from those of the control group. The psychological procedures used were the Wechsler-Bellevue Adult Intelligence Scale, the Rorschach Personality Test and a personality rating scale which was filled in by a psychiatrist.

All subjects were in treatment at the Audiology Clinic, Veterans Administration, New York Regional Office. All were male veterans of World War II between the ages of 21 and 42 and were suffering from a bilateral hearing loss that was either incurred in or aggravated during military service. Only those patients whose diagnosis was unanimously concurred in by the Otologist, Clinical Audiologist, Psychiatrist, Clinical Psychologist and Psychiatric Social Worker were included in this study. An extensive battery of audiometric tests was administered to each patient as part of the qualifying procedure. The groups were equated for age and education. The statistical procedures used in examining intra-group differences were primarily measures of central tendency; the procedures used in measuring inter-group differences were primarily chi-square analysis and Student's *t*. The data were treated both quantitatively and qualitatively.

Analysis of the performance of both groups on the Wechsler-Bellevue Adult Intelligence Scale revealed that the Psychogenics were functioning on a significantly lower intellectual level than were the Organics for all three measures of intellectual functioning (Full Scale, Verbal and Performance) and Information, Digit Span,

* Microfilm copy of complete manuscript of 294 pages, \$3.68.
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Arithmetic, Block Design, Digit Symbol and Digits Reversed. $I + C + S$ minus $D_{Sp} + A + D_{Sy}$ statistically differentiated the groups.

The Personality Rating Scale effectively discriminated between the groups on eleven items. The Psychogenics were less cooperative, more depressed, more gregarious, more easily upset, more suspicious, more cautious, more rigid, more dependent, more anxious and showed less heterosexual interest than did the Organics.

A syndrome of 18 Rorschach factors was derived which differentiated the groups at the .01 level of confidence. It must be recognized, however, that this syndrome (as well as the Wechsler-Bellevue sub-test index) applies only to the specific population examined in this investigation. It cannot be applied to other groups without further research.

The findings of all three psychological procedures were then collated and an integrated picture of the characterological structure of the psychogenic acoustically handicapped was derived. The Psychogenics were found to possess a strong, demanding super-ego structure. In direct conflict with this were aggressive emotional drives which were primarily hostile and sexual in character. The Psychogenics were unable to accept these asocial urges and, in order to protect themselves from the anxiety which was engendered, became inhibited, constricted, withdrawn people. Although a marked reduction of anxiety resulted, this exacted its toll in terms of productivity, creativity and sensitivity. They were rigid, markedly ego-centric, detached themselves from strong emotional ties with others and transformed their hostility into stubbornness, resentfulness, detachment and depression. They were vacillating, uncertain and indecisive. The primary defense mechanisms adopted by the Psychogenics in order to keep their unacceptable emotional drives out of consciousness were denial, withdrawal, somatization and, underlying all, repression.

The symptom of psychogenic deafness was revealed as serving several needs. Primary among these was: 1) withdrawal, which protected the ego from traumatizing interpersonal experiences; 2) self punishment, which resulted in lessening of guilt; and 3) making more justifiable the patients' assuming a dependent role in their relationships with others.

As a group, the psychogenic hard of hearing was revealed to be a poor therapeutic risk. The exception seems to be those in whom the anxiety had been least successfully converted.

On the basis of the results obtained, it was concluded that a constellation of personality characteristics could be identified for the psychogenic hard of hearing and that this personality picture could be differentiated from that of the organic hard of hearing. This has significance in terms of more appropriate and effective treatment and diagnostic procedures.

RELIGIOUS TRAINING AND PERFORMANCE ON CERTAIN INTELLECTUAL TASKS

(Publication No. 2861)*

Marshall Parsons Smith, Ph.D.
Columbia University, 1951

Problem

This study is concerned with whether persons who have had strong formal religious training show a relatively greater readiness for some types of mental tasks than they do for other types, when none of the tasks has any religious reference.

Hypothesis

College students strongly trained in the Roman Catholic Church or in the Lutheran Church, as compared with students having little or no religious training, will tend

- a. to be superior on tasks requiring efficient operation in sharply defined, consistent, and highly structured areas, and
- b. to be inferior on tasks requiring the easy shifting of cognitive orientation and the handling of relatively unstructured materials.

Subjects

Subjects, drawn by questionnaire and interview from the students at a co-educational college, were in four series: 1948 Freshmen, 1949 Freshmen, F series overlapping 1949, and X series of Juniors and Seniors. Each series included three groups: NR — little or no religious training, RC — strong Roman Catholic training, and Lu — strong Lutheran training. Numbers in groups ranged from 34 to 62. Total number of subjects was 411.

Procedure

Initial testing used the American Council on Education Psychological Examination for College Freshmen (ACE). Prior to testing the ACE sub-tests Arithmetic, Number Series, and Same-Opposite were interpreted as favoring those persons with readiness for well structured materials while the sub-tests Figure Analogies, Completion, and Verbal Analogies were interpreted as favoring those persons with readiness for relatively unstructured materials. Predictions were made that groups with strong religious training would be superior to NR groups on the former sub-tests and inferior on the latter.

* Microfilm copy of complete manuscript of 89 pages, \$1.11.
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The 1948 and 1949 groups were tested on the ACE 1948 and 1949 editions respectively, and were matched by total ACE scores within each year series. Differences in means between NR and religious groups were evaluated.

From the 1948 and 1949 groups sub-groups were formed to ascertain whether extremes of religious training or lack thereof brought predicted changes in mean test scores.

Groups of F and X series were tested on the Cognitive Shifting and Pattern Analysis Tests (called Shift and Pattern), both of which were designed for this study. Prior to testing prediction was made that the religious-trained groups would be superior to NR groups on Pattern and inferior on Shift.

Results

Differences between means significant at the .05 level were rare in the comparisons in any one series. When the differences obtained for the two pairs of series were taken as joint occurrences of like events, certain highly significant values were found. The following table gives these values.

P-VALUES SHOWING THE LIKELIHOOD OF JOINT OCCURRENCES OF DIFFERENCES OBTAINED FOR 1948* AND 1949*, AND FOR F AND X
XXX INDICATES INCONSISTENCY. ALL VALUES SHOWN ARE IN THE DIRECTION OF PREDICTION

| Comparisons with NR favoring religious groups | | RC | Lu | Combined RC and Lu |
|---|---------|------|-------|--------------------|
| Arithmetic | (48-49) | .006 | .008 | .004 |
| Number Series | (48-49) | XXX | XXX | XXX |
| Same-Opposite | (48-49) | .05 | .04 | .03 |
| Pattern | (F - X) | XXX | .05 | .06 |
| Comparisons with NR favoring NR groups | | | | |
| Figure Analogies | (48-49) | .10 | .0005 | .004 |
| Completion | (48-49) | .13 | .08 | .08 |
| Verbal Analogies | (48-49) | .001 | XXX | .05 |
| Shift | (F - X) | .007 | .04 | .01 |

* Groups in 1948 and 1949 series matched within series by total ACE.

The sub-division of the 1948 and 1949 groups into extreme sub-groups furnished support to the hypothesis on Arithmetic, Completion, and Figure Analogies and weakened the hypothesis on the other sub-tests.

Investigation of the relationships between certain sociological variables and test performance disclosed none which weakened the hypothesis.

Conclusion

The hypothesis was considered supported and was accepted as a basis for further research.

PSYCHOLOGY, PATHOLOGICAL

A FACTOR ANALYTIC STUDY OF SCHIZOPHRENIC SYMPTOMS

(Publication No. 2704)*

Wilson Howland Guertin, Ph.D.
Michigan State College, 1951

The aim of the present study was to examine the empirical clustering of schizophrenic symptoms. The correspondence between these clusters and schizophrenic syndromes should prove valuable in evaluating the adequacy of the current classificatory scheme for schizophrenia.

To this end, 100 newly admitted patients at a state hospital were rated through personal interviews for the presence or absence of 77 symptoms which occur in schizophrenia. All these patients were diagnosed as schizophrenic and various criteria for exclusion from the sample were employed to guarantee that the final sample would provide as reliable information about as pure a group of schizophrenics as possible. No attempt was made to restrict the sample other than to confine it to the new admissions who were diagnosed as schizophrenic at this particular state hospital.

Only 52 symptoms occurred frequently enough to make it possible to calculate tetrachoric intercorrelations. The inter-observer agreement on the assignment of these dichotomous ratings was sufficiently high to indicate that personal biases were not of any great importance in the assignment of ratings.

Thurstone's multiple group centroid method of factor analysis was employed with only the symptoms showing the tightest clusterings determining the centroids. This made later oblique rotations unnecessary since the original clusters seemed to have psychiatric

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meaning. The first attempt at factoring with eight group centroids overspecified the factor space.

The final factoring employed only five of the eight original group centroids. This factoring left rather large residuals so a final sixth complete centroid factor was extracted. These six factors accounted adequately for the original intercorrelations.

The six factors disclosed were named as follows:

A' Excitement-hostility

B' Psychomotor retardation and withdrawal

C' Guilt-conflict

E' Persecuted-suspicious

H' Personality disorganization

Sixth Unidentified

When the sixth factor is rotated to a position near B' (simple structure) it can be described as confused withdrawal.

Three psychiatrists and a clinical psychologist designated those symptoms which they regarded as most and least pathognomonic of schizophrenia. An analysis of the factor loadings for those regarded as most pathognomonic failed to reveal any factor that might be proposed as a general schizophrenic factor. While a cross-sectional view of schizophrenic symptoms fails to reveal any basis for classifying all the subtypes under a general schizophrenic heading, longitudinal studies might reveal shifting symptomatology or even syndromes which would support such a practice.

There was considerable correspondence between the derived factors and Kraepelin's schizophrenic subtypes. However, these factors, viewed as concepts, should prove of more value than if they are regarded as principles of classification (syndromes). The contribution of this investigation is regarded as theoretical as contrasted with the practical aims of syndromatic classification. These factors, as constructs, should prove the starting place in a systematic exploration of schizophrenia. The advantages of such a methodology are mentioned. Suggestions for further research are indicated.

A PERSONALITY STUDY OF SCHIZOPHRENICS WITH PEPTIC ULCER

(Publication No. 2768)*

Melvyn Myron Katz, Ph.D.
New York University, 1951

It was the purpose of this investigation to determine whether differences in personality were present to distinguish between schizophrenics who had developed peptic ulcer in the course of their hospitalization and schizophrenics with no history of gastrointestinal dysfunction. This study was needed because the question of patient management in a neuropsychiatric hospital setting based on the psychosomatic relationships between peptic ulcer schizophrenia had not been heretofore evaluated. A battery of clinical psychological projective techniques were utilized for this personality evaluation.

The subjects of this study were sixty male schizophrenic patients between the ages of forty-four and sixty-four years, institutionalized at three Veterans Administration Neuropsychiatric Hospitals. The experimental group of thirty schizophrenic patients had a supplementary diagnosis of an active peptic ulcer within a year prior to testing which was demonstrable by conclusive X-ray evidence of an ulcer crater in the gastroduodenal sections of the gastrointestinal tract. The thirty schizophrenic patients in the control group were carefully screened so that only patients with no history of gastrointestinal dysfunction were accepted. The research populations were equated for diagnosis, age, educational level and length of hospitalization.

The projective tests revealed the organization of the structure and dynamics of personality. On the Rorschach Test significant differences were found to exist between the two groups in that the ulcer group tended to utilize both inner and outer controls in coping with inner impulses and demands of the environment. For the ulcer group this indicated a greater degree of mature affective adaptation to the environment and reality as well as a better personal adjustment. Oppositional tendencies were present in the ulcer group but the controlling features of the personality structure mitigated against an impulsive overt expression of this hostility. The non-ulcer group generally lacked these mature controls and showed a less stabilized balance between inner life and outer reality.

* Microfilm copy of complete manuscript of 227 pages, \$2.84. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-508.

On the Thematic Apperception Test the presence of aggressive tendencies in the ulcer group was corroborated and depressive features were also noted. For the non-ulcer patients, withdrawal tendencies accompanied other "loss of control" characteristics, such as frank sexuality themes, expression of violent "death" hostility themes and a tendency to be preoccupied with the pensive moods of others.

The Draw-A-Person Test revealed trends suggesting that the ulcer patients were less evasive and tended to be more cognizant of reality in their awareness of and sensitivity to the opinions of the social group. Conversely, the non-ulcer patients tended to be evasive and not to face reality directly.

On the basis of these findings, it was concluded that personality differences were present to distinguish between the groups of ulcer and non-ulcer schizophrenic patients. These differences were noted in the availability of inner and outer controls in the ulcer group whereby inner promptings were accepted and emotional impulses were channelized into proper forms for affective adaption. In the ulcer group, aggressive feelings tended to be repressed rather than overtly expressed, where they would violate the demands of reality. This appeared also as a greater prevalence of depressive feelings in the ulcer group. More ulcer patients than non-ulcer patients tended toward a greater awareness of and rapport with environmental reality which revealed that the schizophrenics with peptic ulcer tended to be better adjusted and less regressed than schizophrenics without peptic ulcer. Thus, while differences were found in the management of defensive systems, no specific "ulcer personality type" was identifiable among the ulcer schizophrenics in this study. It was recommended that longitudinal investigations be made with psychotic ulcer patients to determine whether their eventual disposition was in accord with the favorable prognostic implications of this study.

THE DIFFERENTIATION OF MILD SCHIZOPHRENIA FROM PSYCHONEUROSIS BY MEANS OF THE RORSCHACH TEST

(Publication No. 2834)*

Mortimer Benjamin Lipton, Ph.D.
Columbia University, 1951

Problem

A major problem in clinical diagnosis is the differentiation of psychoneurosis and mild schizophrenia. This study sought to determine if there are scorable factors in the Rorschach test which differentiate the psychoneurotic from the mild schizophrenic reaction.

Method

The subjects consisted of sixty patients from a large psychiatric clinic, thirty of whom were diagnosed as psychoneurotic and thirty mild schizophrenic. Measures derived from the Rorschach test were evaluated by comparison with the clinical findings. Rorschach scoring categories and ninety-four signs were tested for their power in discriminating the two diagnostic groups.

Diagnostic Procedure

To insure maximum validity of the clinical ratings, a systematic diagnostic procedure was evolved. A high agreement among raters was artificially created by the elimination of doubtful cases. Initially this was accomplished by asking psychiatrists to refer only those cases in which there was reasonable certainty about the diagnosis. Each case was then presented at a conference of at least three psychiatrists. Case material was presented to the group and discussed. Each psychiatrist made his rating individually on a specially prepared form. Provision was made on the form for both the psychiatrist's own evaluation and his diagnosis according to a diagnostic check-list. Main points of differential diagnosis were noted and some statement was made about the rater's confidence in his diagnostic conclusion. A unanimity of opinion was expressed in forty-seven of the sixty cases studied.

Subjects

The educational and occupational levels of the schizophrenics proved to be significantly lower than those of the neurotics. The poorer level of achievement of the schizophrenics is consistent with the belief that schizophrenia is characterized by disorder in

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thought process. It is also true that the difficulty which the schizophrenic has in relating to other people serves to impede his vocational and educational advancement. Although the sample seems to reflect differences in background traits found clinically among mild schizophrenics and neurotics, it is impossible to state how representative this sample is of the general population.

Summary of Results

Sixty cases, thirty mild schizophrenic and thirty neurotic, were tested by means of the Rorschach test. Rorschach scoring categories and ninety-four signs were evaluated for their power in discriminating the two diagnostic groups. Mild schizophrenics were effectively differentiated by twelve signs.

Rejection and on inquiry; M equals 0 to 1; Prescence of irrelevant comments, self-references, excessive fear of imaginations; Statements suggesting uncertainty as to the meaning of the blots; Percepts of variable dimness; Absence of Fc, FK, and Fk; Presence of any of the following: less than three or greater than forty D, less than three W, either W or D greater than 75%; Presence of any of the following: DW, Po, Perseveration, Bizarre responses; Dearth of ideas; Absence of 1 or 2 FK; Populars less than 5; Absence of blood, fire or smoke.

The mild schizophrenic group gave fewer W, K and P responses than the neurotic group but when the total responses was the same for each diagnostic group, there ceased to be an appreciable difference in the occurrence of W, K and P between the two groups. The fewer number of responses in the schizophrenic group, although not significant for the total sixty cases of the experiment, seemed closely associated with losses in the number of W, K and P responses.

The schizophrenic personality seemed characterized by disorders in thought process, an absence of neurotic defenses, evasiveness or "hard blocking," a meagerness of thought, an inadequate expression of affective needs, a generally fearful attitude toward highly unstructured stimuli, a relative absence of auto-critical capacities, a lower level of reality testing than neurotics and a lack of deep intense expression of feeling.

THE ATTITUDES OF MOTHERS OF MALE SCHIZOPHRENICS TOWARD CHILD BEHAVIOR

(Publication No. 2776)*

Joseph Colman Mark, Ph.D.
New York University, 1951

The Problem

The purpose of this investigation was to determine whether the attitudes of the mothers of male schizophrenics differ from the attitudes of the mothers of male non-schizophrenics with respect to child rearing. It was hypothesized that the attitudes of the mothers of schizophrenics would differ from the attitudes of the mothers of non-schizophrenics toward child rearing; it was further hypothesized that these differences would assume certain consistent patterns.

The etiology of schizophrenia is still unknown with no real agreement present as to the process itself. One point of view, the organic school of thought, has as its core the conception of schizophrenia as a disease rooted in constitutional defect; the psychogenic point of view sees schizophrenia as a way of life due to interpersonal difficulties and failures of acculturation.

The Related Literature

There is a rather unanimous agreement in the literature on the great importance of the family as an influence on the child. Freud, Flugel and Sullivan have all emphasized the importance of childhood experiences and relationship to the mother. Fromm-Reichmann has coined the term "schizophrenogenic mother" to describe the mother whose effect on the child may be a factor in the development of schizophrenia. The concept of rejection — overprotection developed by Levy is widely employed in the literature.

Although there is no complete agreement among clinical studies as to the exact relationship between the mother and her schizophrenic offspring, they are all critical of the parent in one way or another and ascribe some particular characteristic to her. Almost all of the studies found that the mothers of schizophrenics were extremely overprotective in their attitudes to their children.

Procedure in Collecting Data

An attitude survey of one hundred thirty-nine items was employed. The items are phrased in stereotyped fashion after a

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technique used by Shoben, as for example, "A child should be seen and not heard." The mothers were asked to respond on a four-point scale: strongly agree (A), mildly agree (a), mildly disagree (d), strongly disagree (D).

The experimental group consisted of one hundred mothers of male schizophrenic patients hospitalized at the Veterans Administration Hospital, Northport, Long Island, New York. The control group consisted of one hundred mothers of male non-schizophrenics recruited in the New York area. The following factors were controlled: age, religion, education, socio-economic status and age of children.

The Results of the Study

Sixty-seven of the one hundred thirty-nine items were found to differentiate the mothers of male schizophrenics from the mothers of male non-schizophrenics on the basis of an item analysis. By the use of the chi-square technique sixty-seven items were significant at the .05 level of confidence or better.

Four judges grouped the significant items into clusters. The clusters revealed the mothers to be mainly "restrictive" in their use of "measures of control"; there were both "rational" and "emotional" attitudes when "intellectual objectivity" was considered; and there were both attitudes of "excessive devotion" and of "cool detachment" expressed.

The Conclusions

It was hypothesized that the attitudes of the mothers of schizophrenics will differ from the attitudes of the mothers of non-schizophrenics toward child rearing. The results of this experiment serve to support this hypothesis as sixty-seven of the one hundred thirty-nine items surveyed differentiated these two groups.

It was further hypothesized that these differences will assume certain consistent patterns. In an external sense, the patterns of attitudes are not consistent. That is, there are, for example, both attitudes of devotion and detachment expressed. But the clusters are "consistent" with certain theoretical explanations derived from dynamic psychology.

VOICE QUALITY IN THE SCHIZOPHRENIC REACTION TYPE

(Publication No. 2777)*

Estelle Witzling Moskowitz, Ph.D.
New York University, 1951

An experimental study was undertaken to analyze the voice quality associated with the mechanism of retreat from reality in individuals diagnosed as schizophrenic reaction type. A group of forty schizophrenic individuals, twenty of whom were ambulatory, and twenty of whom were institutionalized, were matched in age, sex, race, and education, with 40 "normal" subjects. Diagnosis of schizophrenia was made by the psychiatrists of the cooperating hospitals. In addition, a Rorschach test was administered to each member of the experimental group to support the psychiatric diagnosis.

The study focussed upon the voice quality of the individuals, and not upon the language content or the articulatory pattern of the subjects selected for this study, since the aim was to isolate the one symptom under consideration. Analysis of voice quality was made in terms of adjective description; for example, "monotonous," "shrill," "gloomy."

Each of the eighty subjects was given the same stimuli: statements from the Minnesota Multiphasic Personality Inventory, and selected pictures from the Thematic Apperception Test. Disc recordings were made of the responses, and the recordings were analyzed in terms of a prepared Rating Scale. Voice qualities listed on the rating scale were defined.

Analysis of the recordings was made by the experimenter, and comparisons of the incidence of voice qualities was made between the experimental group as a whole and the control group; and between the ambulatory schizophrenics and the institutionalized schizophrenics. In addition, comparison was made of the variation of significant voice characteristics within the experimental group, based on age, sex, and race; and between the experimental group as a whole and the control group, based on these three factors.

The experimenter's judgments were validated by a committee of judges composed of four recognized experts in the field of speech. The committee members listed to the eighty recordings, each of which was identified by number, only. The recordings were heard in random order, and were rated on the rating scale described

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above. When three of the four judgments were in agreement, the voice quality or combination of qualities was accepted for the subject under consideration. A summary and comparison of the judges' reports was made by the experimenter, and the reliability of comparative ratings between the judges' and the experimenter was established.

Conclusions

1. On the basis of significant differences evidenced in the voice qualities of the experimental and control groups, it may be concluded that the presence of a combination of certain voice qualities may be included in the symptomatology of schizophrenia. The combination of monotonous, weak, unsustained, gloomy, and colorless and flat vocal qualities in an individual should arouse suspicion of his psychological state, with particular emphasis placed on the possibility of a diagnosis of schizophrenia.

2. No significant difference in the voice quality of the ambulatory and the institutionalized schizophrenic groups was noted, probably because of the frequently fortuitous circumstances which determined whether or not a subject would be institutionalized.

3. A comparison of significant voice characteristics within the experimental group based on sex seems to indicate that males are characterized by unsustained voice quality to a greater degree than females. Females are more prone to have weak voice quality than are males.

4. A comparison of significant voice qualities within the experimental group based on race seems to indicate that whites tend to be somewhat more gloomy than negroes.

5. A comparison of significant voice qualities within the experimental group based on age within the 15 to 30 year age epoch, must be considered negative at the present time.

**IDEATIONAL CONCEPTS OF PARENTAL FIGURES IN
PARANOID SCHIZOPHRENIA: AN INVESTIGATION INTO THE
RELATIONSHIP BETWEEN LEVEL OF ADJUSTMENT AND
AN AREA OF INTERPERSONAL RELATIONSHIPS,
AS MEASURED BY FOUR TECHNIQUES**

(Publication No. 2780)*

Stanley David Needelman, Ph.D.
New York University, 1951

Interest has been increasing in recent years in the relationship between family environment and the appearance of schizophrenic behavior. Many studies indicate that parents of schizophrenics tend to be overprotective and overbearing, and that the schizophrenic, during the period of growth, was surrounded by parental restrictions that precluded the appearance of mature techniques used in interpersonal relationships. It is also reported in the literature that there is a close association between behavior and subjective evaluations of the environment.

This study was concerned with the phenomenological impressions of parent-child relationships of thirty male paranoid schizophrenics and thirty normal control subjects. The purposes of the study were to determine to what extent schizophrenics' attitudes differed from normals', to trace the relationship between the phenomenological environment of the schizophrenic and the dynamics of his behavior, and to note the degree to which schizophrenic reconstructions of parental behavior coincide with descriptions reported in the literature.

Four techniques were utilized. A direct questionnaire elicited consciously held attitudes concerning one's own parents. An indirect questionnaire permitted the noting of systematic bias as appeared in the selection of "true" endings for "factual" statements concerning family relationships. Results obtained with this method were associated with the perceptions of the way "others" approached parental figures. Incomplete stories relating to family situations provided a means for studying reactions to a wide variety of such situations. The Thematic Apperception Test determined attitudes toward and methods of reacting to parental figures via a widely used projective method.

Items of the two questionnaires were judged prior to their being used according to two sets of categories. One set was the

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direction categories, based on Horney's writings, and included toward, away, and against sub-categories. The second set was derived from Fromm's description of rational and irrational behavior. These included healthy and unhealthy sub-categories. A third set of scores was obtained with combined categories. These were based on items which were scorable by both the direction and healthy-unhealthy systems. Combined categories included toward-healthy, toward-unhealthy, away-against-healthy, and away-against-unhealthy sub-categories. These categories were also used for scoring responses to the incomplete stories and the Thematic Apperception Test.

Schizophrenics responded more frequently in toward fashion than did normals. They chose fewer away and against responses compared to normals; they chose fewer healthy but more unhealthy endings. Particularly significant differences between the groups appeared for toward-unhealthy and away-against-unhealthy categories.

Qualitative and quantitative results indicated that schizophrenics reconstructed parental behavior in toward (overprotective, dominant) terms. The greatest consistency among experimental subjects, and the point at which they deviated most radically from the normals, was in the evaluations of their own reactions as being of a toward (compliant) nature. It is indicated that schizophrenics were influenced in their phenomenological perceptions by a need to deny, in Fromm's terminology, parental irrationality. They could not tolerate the concept of punishment, (which they tended to regard as a symbolic equivalent for destruction). The way in which they structured their own behavior pattern suggests that they inhibited feelings of hostility, feelings which they regarded as dangerous and with which they could not cope.

SOCIOLOGY

THE SOCIOLOGY OF ROBERT E. PARK

(Publication No. 2798)*

Barbara Klose Bowdery, Ph. D.
Columbia University, 1951

Although the American sociologist, Robert E. Park did not begin his truly sociological work until middle age when he joined the staff of the University of Chicago, he left behind him significant contributions to sociological thought and a circle of former students profoundly influenced by his devotion and enthusiasm. Park was fired by a great zeal for social reform; after many years spent directly in efforts toward the improvement of the Negro race he came to systematic sociology in part because he felt that successful reforms must be based upon adequate knowledge.

A portion of Park's theoretical system is a classification of social processes into two great groups, represented by such terms as "sympiotic" and "competitive" for the one group, and "social" and "communication" for the other group. The substructure of human relations, in his view, is a competitive order, in which men struggle to obtain the basic necessities of life. Some kind of a division of labor, or some sort of mutual adjustment among the different groups found in a community to each other's more elementary needs and desires for food, clothing, and shelter occurs as a result of this life struggle. The sympiotic, competitive order also has a spatial element; geographical distances may give rise to social distances and also form the basis for the ecological interpretation of social phenomena.

The other basic social process, in Park's sociology, may be described by such terms as "communication" and "consensus." Common values and meanings and understanding of each other characterize this second aspect of society, which, however, rests upon the division of labor resulting from the competitive, sympiotic process.

Perhaps Park's greatest contribution is his view as to the nature of the individual and the person, and the resulting emphasis upon the twin concepts of status and role. Park's statement that a person is an individual who has status is a sociological classic. One's social status calls attention to the social distances which separate him from others, while the concept of social role is the dynamic aspect of one's social position.

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Park was never "merely" a theorizer. He was greatly interested in several different areas of actual social life — race relations, the various phenomena of city life, and public opinion and the newspaper. In all these areas Park contributed important insights and points of view. He spent many years working among Negroes, directly and indirectly helping them to rise in social status. He also investigated the life situations of the various kinds of immigrants into this country and described the process of "groupwise" assimilation, by which many immigrants become Americanized as groups rather than as individuals. Park and his students investigated at first hand the various ecological areas of a large city, attempting above all to understand what it meant to live in the ghetto, the slum, on the Gold Coast, or other areas. Park's earliest sociological interest lay in the general field of public opinion. He studied the changing function of the newspaper and its distribution. One of his most important points of view is his concept of public opinion which to him is not simply a position on some controversial issue, but is rather a process by which events are discussed, action is taken, and the hitherto controversial issue drops out of sight as it becomes part of the mores. Park also distinguished crowds and publics; the former is non-critical and emotional while the latter involves the opinion process.

Park's insights and points of view have not been as fruitful in leading to new sociological inquiries as might have been expected, essentially due to his failure to ask significant questions and to form hypotheses about the material with which he is dealing.

TRADITIONAL PATTERNS IN THE INTERIORIZATION OF THE IDEALS OF WOMANHOOD BY HINDU GIRLS

(Publication No. 2802)*

Margaret Lawson Cormack, Ph.D.
Columbia University, 1951

This study, organized from data given by Indian women, describes how the ideals of womanhood are interiorized by Hindu girls as they grow up. Much is directly included in their family training; much is indirectly transmitted by the social mores.

Hindu society is traditionally based on the "joint family," a patriarchal pattern in which sons bring wives into their fathers' homes, daughters leave to join their husbands' homes, the property

* Microfilm copy of complete manuscript of 358 pages, \$4.48.
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and earnings of the whole family group are jointly used, and the authority rests with the eldest male. "Children are wealth," but for religious and economic reasons sons are preferred to daughters. However, once a child is born, so great is the love of children, that infants are nurtured in an atmosphere of affection. They are raised "naturally," more or less by the entire family, thus encouraged to little autonomy. There are strict social and religious rules to which all adhere, but children are permitted great freedom within certain limitations.

Family relationships play a large part in the social patterns, with emphasis on duty, obedience, and respect owed to older persons. Girls have no status-free relationships save with brothers of about the same age, these brothers being companions as well as protectors. Punishments are "social," with emphasis on consideration for others. Girls become more and more consciously feminine as they grow up, femininity being, in fact, highly respected. There is no competition with the male world. Girls want to become as "Sita," the ideal wife.

Puberty is often a period of shock and strain, this sudden body change bringing new social rules — wearing a sari, becoming more "modest," being more strictly protected in public, being expected to take more part in household duties, and often being subjected to segregation during menstruation. There is little rebellion, girls accepting their roles as natural. As adolescents they do not lose family anchorage, but they suffer some role ambiguity as they hover between childhood and adulthood. In a society emphasizing social harmony, this maladjustment seems to result in inner suffering but little overt aggression.

Betrothal is a formal contract between families of the same caste, a dowry accompanying the bride. Young people of today are usually permitted "consent." Parent-planned marriage is preferred by most Hindus, and the experience of many "love-matches" has brought a swing back toward parent-planned marriages in the progressive groups that dared a new pattern. Similarly, though some education increases a girl's marriage chances, there is a tendency to discourage higher education for women, as girls should marry men who are older and with higher qualifications.

Marriage is spiritual "re-birth" for a woman, and with it she enters a new life, with a new status. However, she does not completely realize her feminine self until she becomes a mother, especially the mother of a son. And as she grows older, particularly in becoming the senior woman in a joint family, she gains in actual authority power within the family group. She realizes her creative role.

Hindu women are compliant and submissive, but they have great self-respect and are unusually psychologically "secure" as group

members. They achieve a unique sense of selfhood. The Hindu non-competitive system of great differentiation of sex and of function accords a useful and unique position to each person, with a minimum of guilt and anxiety. Interdependence and harmony are essential; individualism is unimportant.

HIGH SCHOOL DATING AS A BEHAVIOR SYSTEM

(Publication No. 2876)*

John Richard Crist, Ph.D.
University of Missouri, 1951

Research concerned with marriage and the family has neglected the phenomenon of dating, especially high school dating. The present study was therefore exploratory and analyzed this phase of the adolescent culture as a behavior system.

The data for the study were gathered during 1950 by personal interview from the 120 high school students (the ninth through the twelfth grades) of the Laboratory School of the University of Missouri, Columbia, Missouri. In addition to personal interviews, four students, two boys and two girls, participated in a spontaneous panel discussion on dating in high school. This panel was recorded on wire and later transcribed.

Treatment and interpretation of the data relied heavily upon extensive comments and explanations which students gave concerning their attitudes and practices in regard to high school dating. The quantitative findings and the panel discussion were used to support as well as to add to the above-mentioned material.

The study aimed at the following objectives: 1) to analyze as completely as possible within the framework and limitations of the study the dating behavior of high school students and to show how dating activity is a part of a behavior system; 2) to determine what changes take place in this behavior during the last three years of high school as compared with the first year; 3) to ascertain the extent to which the practices and attitudes differ for girls and boys; 4) to determine if selected dating practices differ for urban and rural and for farm and non-farm students; 5) to show to the extent possible the effects upon dating behavior of two basic primary groups, the adolescent age-group and the family; and 6) to add to the body of sociological knowledge information concerning this early phase of heterosexual relationships, colloquially known as "dating," among high school students.

* Microfilm copy of complete manuscript of 356 pages, \$4.45
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High school dating was found to constitute a behavior system which, as might be expected, was based partly upon sex and age-grading. This behavior system involved shared attitudes and values of its members and consisted of patterns which seemed to organize feelings, thoughts, and behavior about one's self and others.

The primary groups of the adolescent peer culture and that of the family appeared to be important determinants of the behavior pattern. For most students the influence of the peer group seemed to become more important and that of the family less important as the student advanced in age.

The farm students were found to participate less fully in the dating behavior system than urban students. It appeared that the farm family had a greater influence on the practices and attitudes of their adolescents regarding dating than did the urban family.

Deep-seated intergenerational conflicts and tensions were found to be associated with authoritarian parental control.

In this high school, dating, including "going steady," was found to be primarily a heterosexual socialization process rather than a courtship process.

Girls were generally more active participants in the dating behavior system than boys. Happiness or adjustment in the early dating experience was found to be associated with non-dating experience in the heterosexual gang or clique before engaging in dating.

KIN AND NON-KIN IN CHINESE SOCIETY:
AN ANALYSIS OF EXTRA-KIN RELATIONSHIPS IN
CHINESE SOCIETY WITH SPECIAL REFERENCE TO A
SELECTED COMMUNITY-CH'U HSIEN

(Publication No. 2813)*

Morton H. Fried, Ph.D.
Columbia University, 1951

This paper attempts to describe, illuminate, and analyze the relationships which take place in the extra-familial sector of social life in one specific locale in China. The bulk of the work is based on field observations made in Ch'u Hsien, a county seat in east-central China, during the years 1947-1948; where necessary and available, supporting or comparative material has been introduced from other sources.

* Microfilm copy of complete manuscript of 287 pages, \$3.59. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-550.

It is apparent that the citizen of all classes in Ch'u Hsien lives much of his life beyond the orbit of relationships provided either by his family or the kinship system in which he is involved. On the basis of field data, we have concluded that most of the extra-kin contacts and associations do not repeat familistic organization or familial functions.

The fields in which non-kin relationships take place are numerous and diverse and cover almost the entire range of human experience. Certain areas of life, however, show greater non-kin dependence than others. The economic realm, for one, shows a great proliferation of non-familial ties. One example may suffice: in the realm of maintaining a balance of labor on a farm, non-kin relationships become crucial in supplementing an inadequate labor reserve or in siphoning off, in a productive fashion, such labor surpluses as may exist.

In the political arena, it may be shown, that few if any, families or groupings of kin can operate for long in the social milieu of Ch'u Hsien without making contact with some powerful agency of legal enforcement, exploitation, or generalized control.

One semi-institutionalized aspect of the non-kin relationship in Ch'u Hsien is the concept of kan-ch'ing, which describes an affectionate interaction between two unrelated individuals who frequently occupy different status levels in the society. In such a relationship one of the parties may be actively and openly involved in the exploitation of the other. The kan-ch'ing relationship pervades the social fabric of Ch'u Hsien, appearing in all sorts of transactions and making cohesive numerous types of social interaction which are potentially centrifugal.

The basic relationships involved in the production and distribution of foodstuffs, tools, clothing and ceremonial items as well as the provision of education, religious satisfaction, and legal standards, continually exceed the world of familial rights and obligations. The patterning of these relationships beyond the kin group follows class lines and, if studied comparatively, may give rise to new understandings of the development of the state as a cultural institution.

THE POLITICAL BEHAVIOR OF NEGROES IN NEW YORK CITY

(Publication No. 2842)*

John Albert Morsell, Ph.D.
Columbia University, 1951

Subject and Method of Study

An analysis of political behavior among the Negroes of New York's Harlem, this study traces developments since the second decade of this century with respect to such matters as the volume and trend of participation, the history and character of political organization, the role of women voters, and the sociological determinants of voter decisions. It includes a case report of the 1944 presidential and congressional campaigns in Harlem, in which the course of the campaign is reviewed as seen in public meetings and propaganda, in the issues stressed or ignored, in the variety of appeals employed, in the local newspaper coverage, and as conditioned by the community background against which these emerged.

The study is primarily exploratory. It does seek, however, to examine the evidence regarding one broadly stated question: Do the Negro voters of Harlem make their racial identification the prime consideration in political choices, or do they vote according to more diverse criteria similar to those found to underly the behavior of the voters of the city as a whole? Comparison between Harlem and the Borough of Manhattan is thus a fundamental element in the approach to the data.

Findings

The findings, with minor exceptions, do not support the thesis that Harlem Negroes vote in terms of racial identification. In many respects, their participation patterns are practically identical with those prevailing in the city at large, and such differences as are found tend to reflect temporary time lags. This is the case with regard to the proportions of eligible voters who participate, the growth of female participation, the directions of voter preference, the variations in voter interest, the structure and methods of political organization, and the long-term and cyclical trends in participation. The evidence indicates that the principal demographic factors associated with voter preferences among Harlem Negroes are age and sex and that the terms in which the Roosevelt-Dewey choice was made in 1944 were substantially the same as those on which the choices were made by the voting public of the city and nation as a whole.

* Microfilm copy of complete manuscript of 224 pages, \$2.80. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-579.

FREE CHURCHES AND SOCIAL CHANGE:
A CRITICAL STUDY OF THE COUNCIL FOR SOCIAL ACTION
OF THE CONGREGATIONAL CHRISTIAN CHURCHES
OF THE UNITED STATES

(Publication No. 2847)*

Cyrus Ransom Pangborn, Ph. D.
Columbia University, 1951

The Council for Social Action, when established in 1934, was the first such agency created by any denomination to have official status and a position comparable to a major missions board. It is the product of the denomination's "prophets" and their effort to relate their churches to society in a defensible manner, in the hope that a witness might thus be borne to the Calvinist-Puritan ideal of holiness in the common life without incorporating the authoritarian and uniformitarian defects of earlier experiments. The dissertation is a critical study of this agency — of its work, its organizational developments, its relationship to the denomination, its friends and enemies, and its major assumptions in theology, ethics, and social theory.

The Historical Introduction traces the social development of American Congregationalism from 1620 to 1900, dividing it into the two periods of New England theocracy and nineteenth-century denominational and cultural pluralism. Particular attention is paid to the contribution made by Congregationalists to the rise of the Social Gospel movement after 1870. Chapter II describes the early organizational precedents of the C.S.A.; Chapter III, how the C.S.A. was created, given its departmental structure, and defended against its early critics and opponents.

The work of the Council finds its statement in Chapters IV and V. The program areas are those of international, industrial, race, and agricultural relations, and legislation. Other matters considered are those of publications, personnel, and policy-making procedures.

Chapters VI, VII, and VIII analyze, respectively, the organizational and ideological relationship to the denomination and its constituency, the response both favorable and unfavorable with which the agency has met, and the major claims — theological, ecclesiastical, and sociological — which the Council makes the ground of its endeavors. The social views expressed (a) in the reports of world ecumenical conferences, (b) by similar agencies of other

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denominations, and (c) by the Federal Council of Churches are observed to be of essentially the same character as those of the Council. Taken together they express a normative liberalism which, on the one hand, opposes the nominalism of nineteenth-century individualism and, on the other hand, subscribes to a view of society as an organism in which individuals, corporate bodies, and institutions all alike have identity and reality. Of special interest is the formula of freedom-in-trust, or of creative tension between spiritual autonomy and strict democratic responsibility, which permits denominations to cooperate in ecumenical organizations, or churches of congregational polity to bear a united Christian social witness by means of such an agency as the C.S.A.

The conclusion drawn is that the C.S.A. represents a fruitful effort to relate religion to the common life and the churches to society, and that unless the churches wish to place themselves outside the arena wherein social forces are contending for influence, they must invest resources of money and leadership in social action to an extent of which at present only the prophets dream.

LATENT STRUCTURE ANALYSIS AND RESEARCH ON SOCIAL STRATIFICATION

(Publication No. 2855)*

Peter Henry Rossi, Ph.D.
Columbia University, 1951

The purpose of this monograph is to review certain selected measurement problems in the field of social stratification. The frame of reference for the discussion is the body of measurement methodology and techniques developed in psychometrics. Particular emphasis is placed on a newly developed method, latent structure analysis.

The first section of the monograph is devoted to an exposition of the methodology and procedures of latent structure analysis on an elementary non-mathematical level. Several empirical examples of latent structure analyses of tests are presented to illustrate the uses to which this new method may be put and to make the reader familiar with how latent structures can be interpreted.

The second section of the monograph is concerned with a survey of some of the empirical research conducted on social stratification. A convenient division of stratification theories is made into

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"subjectivist" and "objectivist" types of theories. Each "school's" work is discussed in detail. First, the researches conducted by the subjectivist school are taken up and it is shown that the work of W. Lloyd Warner, August B. Hollingshead and Harold F. Kaufman is very similar to the measurement techniques employed by L. L. Thurstone in the latter's attitude test construction work. The comparison of Thurstone's work with that conducted by the "subjectivists" helps to clarify the nature of the work conducted by this school and opens up several new avenues for further empirical work.

In surveying the "objectivist" school of stratification theories the relationship between general social theory and the "objectivist" position is discussed in detail. An attempt is made to give specific content to Max Weber's definition of "class" through the latent structure analysis of some empirical data. It is shown that Max Weber's discussion of "class" is very similar to some of the basic ideas of latent structure analysis.

It is also shown that certain empirical researches fall half way between objectivist and subjectivist in their formulation. The general methodological distinction between "prediction" studies and "internal consistency" tests (like latent structure analysis) provides the organizing framework for a discussion of W. Lloyd Warner's Index of Status Characteristics.

Cutting across the distinction between "objectivist" and "subjectivist" theories of stratification and presenting a problem common to both schools of thought, is the problem of the dimensionality of stratification. It is shown that latent structure analysis presents a fairly clearcut method of ascertaining dimensionality, and two analyses, both of tests of socio-economic status, are presented to illustrate the latent structure approach.

Another general problem discussed in this monograph concerns how the number of classes in a stratification system may be ascertained. It is shown that by and large the number of classes is a fairly arbitrary decision on the part of the researcher. The latent structure procedures in this regard are discussed in detail and illustrated by two empirical examples.

Additional material may be found in two of the appendices to this study. The researches discussed in the body of this study are primarily those concerned with the placement of individuals within specific stratification systems. Another important problem in the stratification field is the comparison of different stratification schemes. In Appendix B, a discussion is presented of how latent structure analysis might be used to provide a frame for research on comparative social stratification.

In Appendix C a study conducted by the National Opinion Research Center on the prestige standing of different occupations will be reviewed and the data collected is re-analyzed according to the latent structure scheme.

THE F.E.P.C.: HISTORY AND ACCOMPLISHMENT

(Publication No. 2856)*

**Louis Ruchames, Ph.D.
Columbia University, 1951**

The F.E.P.C.: History and Accomplishment is a description and analysis of the origin and achievements of the President's Committee of Fair Employment Practice. The Committee was the off-spring of mass pressure, exerted primarily by minority groups, upon the Administration in Washington during a period of crisis in American affairs. It was created by President Roosevelt in June, 1941, through the issuance of an Executive order and went out of existence in 1946 as a result of Congressional action. Its career was stormy and crisis-ridden. Although limited in its powers — it could not, for instance, impose penalties upon those who violated its orders — it did succeed in mitigating discriminatory practices in industries throughout the country and in increasing the opportunities for employment available to members of minority groups. Through its success, it provided substantial evidence that law, even if in the limited form of an Executive order, if properly used, can play a significant part in lessening and eliminating discriminatory practices. Prior to the Committee's creation, social scientists, leaders of government, and public opinion generally doubted the truth of this assertion. At the time of the Committee's exit, this view had gained the support of substantial numbers of scientists and laymen interested in minority problems.

The impact of the Committee's successes can today be seen in those states and cities which have passed Fair Employment Practice laws and in the many attempts currently being made to induce other states and cities to enact similar laws. On the national level, the effort to enact Fair Employment Practice legislation has thus far failed. Although it has received the overwhelming support of church, synagogue, and minority groups, of labor unions and civil liberties organizations, the opposing influence of Southern legislators and others has been too great to overcome.

* Microfilm copy of complete manuscript of 487 pages, \$6.09. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-593.

NICODEMUS, KANSAS, A STUDY IN ISOLATION

(Publication No. 2901)*

Van Burton Shaw, Ph.D.
University of Missouri, 1951

The purpose of this study is to report on an investigation of Nicodemus, an all-Negro community in northwestern Kansas. In 1877, a group of Kentucky Negroes, desiring to escape their subordination to Southern whites, organized a colony and migrated to Kansas. The hypothesis of the present study is that Nicodemus, engineered as an escape mechanism from white dominance, does not fulfill that function successfully. This hypothesis is derived from four logical assumptions: 1) total isolation from the greater society in an all-Negro community is impossible, 2) in cases of contacts with whites discrimination will be reasserted, 3) in cases of partial isolation, cultural impoverishment will result, and 4) superordinate-subordinate patterns of race relations will condition the intra-Negro interaction within the Negro community.

An observation of the community was conducted during the summer of 1949 when the investigator and his family lived in Nicodemus and participated in its activities. The chief method was participant observation. Supplementary materials came from formal interviews and from published materials and official records about the community.

Because of the lack of adequate communication and transportation facilities, Nicodemus has attained considerable physical isolation. However, because they were the first residents on this frontier, these Negroes assumed much of the responsibility for organizing the county as a political unit. When white settlers arrived the Negroes were loath to give up their positions and became involved in white contacts in attempting to maintain them. In later years the decline of Nicodemus resulted in an economy which failed to be self sufficient. This forced the Negroes into frequent association with whites in order to satisfy their needs.

Although the Negroes faced some discrimination and prejudice from the beginning, the situations in which white dominance is asserted are now more numerous than earlier. They include exclusion from restaurants, segregation in theaters, and exclusion from all private (and many public) social affairs. Remembering their previously dominant role in the area, the Negroes feel frustration

* Microfilm copy of complete manuscript of 438 pages, \$5.48. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A51-637.

concerning these discriminations. To keep from being humiliated they often practice avoidance of whites. When they cannot do so, it is usually necessary to accept the discriminations. Occasionally overt hostility is aroused by a particularly humiliating experience.

The effects of partial isolation were observed to have resulted in a somewhat impoverished culture, particularly in regard to the retention of folk beliefs concerning farming procedures and health practices which are not followed by their more secularized white neighbors. Isolation has also resulted in a proliferation of functionless organizations and in a restricted economy.

The observation clearly demonstrated that the broader patterns of superordination-subordination condition intra-Negro interaction within the community. Poverty (partially the result of discrimination) limits the richness of the contacts of the Negroes with each other. Discrimination discourages school attendance, thereby limiting the development of capable leadership. The desire not to be judged as stereotypically "Negro" has led to many modifications within the Negro community itself, particularly with respect to conventionality of church services and to the relegation to low status of those individuals whose conduct brings adverse judgments against the entire Negro community. The very life of the community depends upon superordinate-subordinate race relations, since Negroes in surrounding predominantly white communities seek outlets in Nicodemus. Without them, Nicodemus would be too small to afford many organizations of its own.

Since these observations seem to uphold all four logical assumptions upon which the fundamental hypothesis was based, it may be concluded that, in spite of certain advantages of isolation, the all-Negro community of Nicodemus, Kansas, has not successfully fulfilled its intended function as an escape mechanism.

THE INTERRELATIONSHIPS OF SOIL FERTILITY,
PLANT COMPOSITION AND ANIMAL BEHAVIOR

(Publication No. 2888)*

Arnold William Klemme, Ph.D.
University of Missouri, 1951

In this exploratory study of the interrelations of soil fertility, plant composition and animal behavior, the soils selected were chemically tested and the deficiencies in the major plant nutrients corrected. These included nitrogen, phosphorus, potassium and calcium. In addition, a trace element mixture was applied on all except the control plots to remove these elements as limiting factors to plant growth.

Careful observations were made of the growing crop plants for symptoms of nutrient deficiency as these developed. Crop yields were measured. Spectrographic and chemical examinations were made of the concentrations of the trace and other inorganic elements in the forages. The health of the dairy cattle consuming the forage and feed, as indicated by ease of conception, vitality of calves at birth, milk production per cow, and susceptibility to disease was likewise closely observed.

In field trials established during 1946 to 1949, a trace element mixture increased crop yields significantly. An application of 100 pounds per acre of a trace element mixture gave increases in yields of corn from 11 to 17 per cent respectively on Putnam and Marshall silt loams. The same trace element mixture gave as high as 22 per cent increase in corn yields and from 3 to 43 per cent increase in seed cotton on the sands and sandy loams in Southeast Missouri.

For the observation and study of the interrelation of soil fertility, plant composition and animal behavior, a 330 acre dairy farm on soil, which was derived from impure limestone and located near Bois D'Arc in Green County, was selected.

Chemical tests and spectrographic examinations of the soil at the time of selection of this farm indicated that it varied widely in soil fertility. The dairy cattle were genetically similar and under the same management. They had been kept on the two different units of this farm. They were consuming the same species of crops grown on these soils of different fertility levels. They exhibited wide differences in health and ability to reproduce. Those

* Microfilm copy of complete manuscript of 124 pages, \$1.55.
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consuming the forages from the soil of low fertility on the one farm gave birth to many more calves of low vitality at birth and were more heavily infected with Brucellosis than the cattle having access to forage and feed grown on the more fertile soil of the other farm.

At the beginning of this study the two herds from the two farms were combined into one unit and the soil fertility deficiencies corrected by the use of rock phosphate, superphosphate, potassium chloride, nitrogen as ammonium nitrate and ammonium sulphate, magnesium as epsom salts, and dolomitic limestone. A trace element mixture was also used on all except the control plots. It was applied at the rate of 100 pounds per acre, and consisted of 55 pounds of 65 per cent manganese sulphate, 10 of borax, 15 of copper sulphate (bluestone) 10 of zinc sulphate and 5 of cobaltous sulphate (commercial grade). Crop yields were significantly increased. Symptoms of plant nutrient deficiencies occurred only on the control plots.

Where the trace element mixture was applied to the soil, the concentrations of these elements in immature oats, barley, and alfalfa were higher in the first crop after application than in the controls. Later crops varied widely in their dwindling concentrations of these elements.

With the correction of soil fertility deficiencies and the production of more nutritious feed, a marked improvement in the health of the cattle occurred during the period of this study. This improvement was manifested by 1) a higher concentration rate, 2) larger and stronger calves at birth and fewer abortions 3) larger semi-monthly milk sales per cow and 4) more resistance to various ailments, including Brucellosis.

TRACE ELEMENTS AS FERTILIZERS AND SOME OF THEIR EFFECTS ON THE QUALITY OF FEED GROWN

(Publication No. 2890)*

Fred Eugene Koehler, Ph.D.
University of Missouri, 1951

The effects of treating the soil with the trace elements, copper, zinc, manganese, boron and cobalt, on plants grown on that soil were studied. Chemical analyses were made for some of the essential nutrient elements and for the essential amino acids. The quality of the feed was determined by bioassays, using rabbits as test animals.

* Microfilm copy of complete manuscript of 101 pages, \$1.26. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-626.

The investigation was divided into two sections. In the first, a forage crop (alfalfa) was studied, and in the second, a seed crop (corn) was investigated.

The addition to the soil of magnesium plus trace elements increased the concentration of phosphorus in alfalfa grown on that soil by 17 percent, of tryptophane by 35 percent, and of methionine by 19 percent over alfalfa grown on soil with no treatment.

The rabbits which were fed this alfalfa (magnesium plus trace elements) were 15 percent better gains, wasted 26 percent less hay, and gained 22 percent more per unit of hay fed than the rabbits fed hay grown without soil treatment.

The hays grown using only magnesium and only trace elements were about the same as that grown with no soil treatment.

Corn was grown on plots which received 21 different combinations of major and trace elements. The relative hardness of samples from these plots was found to vary greatly with soil treatment. Animal preference for these samples also varied greatly with soil treatment.

Seven of these 21 samples were assayed for the essential amino acids and for feed value. The concentration of amino acids in the corn varied with soil treatment. Rations made up of three parts corn to one part lespedeza hay were low in tryptophane, methionine, and lysine. The use of these amino acids as supplements in the rations caused an increase in gains of the rabbits.

The importance of element balance was emphasized by the fact that the poorest corn with respect to animal preferences and to animal gains was grown on plots which received some of the heaviest fertilizer treatments.

THE RELATION OF OXYGEN TENSION TO OXYGEN
CONSUMPTION IN RHABDITIS STRONGLYOIDES
AND OTHER NEMATODES

(Publication No. 2726)*

Thomas DePinna Bair, Ph.D.
University of Illinois, 1951

Employing a micro-Winkler method, the oxygen consumption of the nematodes, Rhabditis strongyloides, Rhabditis elegans, and the infective larvae of the small strongyles of the horse was determined. Survival times relative to oxygen tension were determined in the case of two nematodes, Rhabditis strongyloides and Rhabditella axei. Oxygen tensions ranging from 20.7 mm. Hg to 383.1 mm. hg were used. The worms were placed in small chambers in a dilute saline and allowed to respire for a given length of time. A parallel blank analyzed with the samples from the chambers containing the worms made it possible to calculate the amount of oxygen consumed by a given number of worms in a given time. The oxygen tension of the saline was varied by bubbling oxygen or nitrogen through it. Curves were constructed in which oxygen consumption in ccO₂/gm wet weight was plotted against the oxygen tension of the saline expressed in mm. Hg.

Rhabditis elegans, a free-living nematode showed a steady increase in oxygen consumption with increased oxygen tension until a tension of about 121.5 mm. Hg was reached. At this point further increases in oxygen tension had little effect upon oxygen consumption. Rhabditis strongyloides, a nematode recovered from skin lesions on a cow, showed an increase in oxygen consumption with increasing oxygen tensions until a tension of 58.5 mm. Hg was reached. Beyond this point the oxygen consumption shows little increase over a wide oxygen tension range. Small horse strongyle larvae, a free-living stage of a parasitic form, consumed oxygen at a very low and almost constant level over the entire range of oxygen tensions used.

The survival time of Rhabditis strongyloides increased in a linear fashion with the oxygen tension. The survival time of Rhabditella axei also increased lineally with the oxygen tension but at a lower level. These results are shown graphically. Curves are calculated for all data and the standard error of estimate computed for each group of points.

* Microfilm copy of complete manuscript of 67 pages, \$1.00.
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Card Number Mic A51-467.

A review of the literature on oxygen consumption related to oxygen tension in invertebrates is given. Methods of oxygen determination are summarized and the micro-Winkler method described in some detail. A new microburette design is shown. The data are compared with the work of others in helminth physiology and the significance and implications discussed.

THE EFFECTS OF HORMONE ANTAGONISM IN THE MAINTENANCE OF PREGNANCY IN THE RAT

(Publication No. 2878)*

Wells Eugene Farnsworth, Ph.D.
University of Missouri, 1951

The interaction of hormones in the maintenance of ante-placental pregnancy was studied in the ovariectomized white rat, Mus norvegicus albus. Pertinent aspects of uterine physiology including relative acidity, progestational reaction, epithelial height, and stromal edema were used in attempting the description of the effects of the various results. Changes in the adrenal weight were also followed.

It was found that the daily administration of 1 milligram of progesterone plus 0.5 microgram of estrone (1.0:0.5) produced uterine conditions most like those of mock-ovariectomized animals. In the spayed rats of this treatment group, both the number of implantations and the per cent of these which developed normally were higher than in animals of any other treatment group.

The second most efficient treatment (1.0:1.0) showed 81% of the nidatory efficiency and approximately 50% of the competence for embryo maintenance found in the less estrogenically potent treatment group (1.0:0.5). It was noted that some of the embryos maintained by 1 milligram of progesterone plus 1 microgram of estrone were decidedly more advanced in development than any produced by other treatments and that a number of the embryos supported by 1.0:0.5 were retarded. Since the level of estrogen activity in the uterus begins to rise on the thirteenth day of pregnancy and since this is the time of formation of the allantoic placenta, it was suggested that the increased size of the embryos of rats receiving the treatment with more estrogen (1.0:1.0) might be due to the higher estrogen content of this treatment being nearer the optimum amount required for the formation of the allantoic placenta.

* Microfilm copy of complete manuscript of 133 pages, \$1.66.
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Comparison of the effects of series of progesterone-estrogen treatments in ratios of 2000:1 and 1000:1 (e. g., 1.0:0.5 and 1.0:1.0, respectively) revealed that increases in the absolute amount of hormone administered in either of these series did not produce identical results and that the trend of several of the physiological factors was almost opposite in direction in the two series.

Finally, from the comparable variations of nidatory efficiency, adrenal weight, and stromal edema, it was suggested that desoxycorticosterone may possibly be secreted by the adrenal to compensate for deficiencies of progesterone and that certain other adrenal secretions may be utilized in the gestation complex elicited by higher estrogen levels.

REVISION OF THE GENUS *TORYMUS* IN AMERICA NORTH OF MEXICO (HYMENOPTERA, *TORYMIDAE*)

(Publication No. 2718)*

Siegfried Eric Lienk, Ph.D.
University of Illinois, 1951

The genus *Torymus* is by far the commonest and the most widely distributed group of the family *Torymidae*. Economically it is unimportant, although the larvae of one species feeds on the seeds of apple, a habit atypical of the parasitic existence of the other members of the genus. The majority of species is ectoparasitic on the larvae of dipterous or hymenopterous gall makers.

In 1927 Huber revised this genus and based his revision, with but a few exceptions, on reared material. His study includes drawings of the stigmal veins of the fore wing for most species. There are primarily two types of stigmal veins, sessile and petiolate. This condition provides a convenient means of dividing the genus roughly into two parts. One species, *Torymus denticulatus* (Breland) was found to bridge the gap between the petioled and sessile condition, that is, exhibits an intermediate condition.

The present revision treats 118 species, 38 of them new to science. The bulk of the types is deposited in the United States National Museum. In this study approximately 3,000 specimens from most sections of the United States and parts of Canada have been examined. In the descriptions of new species, preference was given to reared material.

This revision is in part tentative in that the key cannot be used

* Microfilm copy of complete manuscript of 281 pages, \$3.51. Enlargements 6" x 8", 10¢ per page. Library of Congress Card Number Mic A 51-459.

for the identification of males. Characters used for the segregation of females do not hold true for the males and for this same reason it is impossible to associate the sexes of most species.

The saw of the ovipositor is sufficiently stable in Torymus and varies enough among species that it affords dependable characters. Over 500 saws were examined and sketched. Included in the thesis are drawings of the saws of all but a few species. These drawings were made from temporary glycerine mounts, by use of a squared ocular and a minimum of 440 magnifications. All saws removed from the specimens have been glued to a card-point and placed on the same pin with the specimen.

The most satisfactory specific characters found were comparative sizes of two structures on the same specimen, namely, the length of the scape versus the intermalar distance, length of pedicel in proportion to malar distance, dimensions of certain segments of the funicle, and the relative length and width of the head. Drawings of all these areas and structures are included in the thesis.

A list containing all the information at present available concerning the hosts of the various species of Torymus is included. The majority of the species are parasitic on gall making Hymenoptera and Diptera. One lepidopteron, Laspeyresia youngana Kearf., whose larvae burrow within the seeds of spruce cones, is parasitized by Torymus laspeyresi n. sp. Several other species have been reared from seeds. However, there are no clues as to whether they are phytophagous, or parasitic on other seed-inhabiting insects. Five species of Homoptera serve as hosts. T. scalaris (Huber) and pachypsyllae Ashmead parasitize the nymphs of the chermid gall maker on Celtis spp., whereas T. oviperditor (Gahan) is predacious on egg clusters of the Cicadidae.

Except in cases where species have been redescribed, the original description is incorporated with a brief summary of additional diagnostic characters.

ENZYMATIC AND STRUCTURAL STUDIES ON CELL NUCLEI

(Publication No. 2896)*

Robert Jack Neff, Ph.D.
University of Missouri, 1951

A method has been devised for isolating nuclei in ethylene glycol. The protein content and enzymatic activity of these nuclei are not comparable to that of nuclei isolated by other existing methods. The ethylene glycol method seems satisfactory for determining DNA content of nuclei. With tissues having abundant cytoplasm, the removal of cytoplasmic protein from nuclei seems incomplete. Nuclei from tissues having little cytoplasm originally seem to lose soluble nuclear material.

Calf thymus nuclei isolated in ethylene glycol swell to twenty to thirty times their original volume when placed in distilled water. It was shown that this effect was not an osmotic phenomenon but was probably attributable to a hydration of the nucleoprotein content of the nucleus. Shrinkage, which occurred when the pH of the suspending medium was lowered slightly, was considered to be a result of the interaction of acidic protein and nucleohistone. This interaction produced a dehydration of the nucleoprotein which caused the nucleus to shrink. Reversible shrinkage in isotonic saline was considered to be due to the same factors that effect the precipitation of nucleohistone — namely a dehydration and charge neutralization of the nucleoprotein of the nucleus. Irreversible shrinkage of water swollen nuclei by polyvalent cations and proteins was considered to be caused by a common mechanism involving chelation of these reagents with nuclear constituents.

The high viscosity of nuclei dissolved in molar saline was shown to be due in part to the presence of protein, since crystalline trypsin lowered the viscosity to a new constant level. The studies on dissolved nuclei in dilute alkali were consistent with current ideas of dissociation of nucleoprotein salt bonds in alkaline solution.

The inability of chicken erythrocytes, prepared in ethylene glycol, to swell in water and molar saline provided evidence for incomplete removal of cytoplasmic protein by the glycol method. That protein was the binding agent was demonstrated by the ability of these nuclei to form viscous solutions when digested with trypsin or chymotrypsin.

* Microfilm copy of complete manuscript of 201 pages, \$2.51.
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In *Arbacia* sperm, trypsin addition caused the simultaneous release of DNA and digestion of protein. Interpretation of the quantitative relationships were open to question due primarily to the nature of the biuret reaction. It was assumed that trypsin digested other nuclear material in a manner similar or identical to the digestion of *Arbacia* sperm. Viscosity studies were cited to support this assumption. The changes in viscosity (as well as the clumping of saline suspended nuclei digested with trypsin) were explained as phenomena concerned with the gradual loss in size of the nuclear protein molecules. High polymer nucleic acid was shown not to be depolymerized by the crystalline trypsin used. Sperm digestion was by the same mechanism but complicated by the presence of DNase in the sperm.

Information gained from studies on the tryptic digestion of nuclei was used in examining nucleated erythrocyte hemolysates of a number of vertebrate species. It was found that all erythrocytes examined possessed at least traces of cathepsins and only amphibian erythrocytes possessed DNase. Preliminary experiments on the role of DNase in DNA synthesis were performed.

Adsorption of enzymatic and non-enzymatic protein by nuclei prepared in glycol was shown to be strongly affected by pH. The adsorption was much greater at pH 6.0 than at pH 6.8. The maximal adsorption pH was not determined. It was hypothesized that many of the enzymatic activities associated with nuclei isolated at pH 6.0 are adsorption artifacts.

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PART II

CUMULATIVE INDEX

The following pages contain the titles of all doctoral dissertations which have been published since the appearance of Volume X, No. 4 of MICROFILM ABSTRACTS (Dec. 1950). Abstracts of the following dissertations have been published in MICROFILM ABSTRACTS and in special volumes prepared for Pennsylvania State College and Colorado State College of Education. All may be identified by the letters and date following the reference.

- (M.A. . .) Microfilm Abstracts, University Microfilms, Ann Arbor, Michigan.
- (P.S. . .) Abstracts of Doctoral Dissertations, Pennsylvania State College, State College, Pennsylvania.
- (C.S. . .) Abstracts of Field Studies for Degree of Doctor of Education, Colorado State College of Education, Greeley, Colorado.

Positive microfilm copies of the complete manuscript of any of these titles may be had at 1-1/4¢ per page, or paper enlargements, 8-1/2 x 11 inches accommodating two pages each, at 10¢ per page, from University Microfilms, Ann Arbor, Michigan. Order should be made by "Publication Number," and Title.

AGRICULTURE

Reaction of winter barley varieties to collections of *ustilago nuda*. Charles Kenneth Cloninger, Ph.D. Univ. of Mo., 1951. 273 pp., No. 2327. (M.A. 1951, Vol. XI, No. 2)

AGRICULTURAL AND BIOLOGICAL CHEMISTRY

Comparative study of the synthesis of the ten essential amino acids and riboflavin, niacin and pantothenic acid in the rumen of cattle on normal purified rations. Indra Prasad Agrawala, Ph.D. M.S.C., 1950. 79 pp., No. 2490. (M.A. 1951, Vol. XI, No. 3)

On the composition and chemical structure of the hemicelluloses from cornstalks (zea mays). Emmett Bennett, Ph.D. Penn. State College, 1950. 99 pp., No. 2233. (P.S. 1950, Vol. XIII)

Vitamin A from different sources as related to body weight and liver storage of vitamin A in the chick. Frank F. Castano, Ph.D. Penn State College, 1950. 94 pp., No. 2234. (P.S. 1950, Vol. XIII)

Laboratory and field comparisons of tenacity agents for agricultural spray fungicides. John Boyer Harry, Ph.D. Univ. of Penn., 1948. 184 pp., No. 2139. (M.A. 1951, Vol. XI, No. 1)

A study of the effect of blanching and of frozen storage on the activity of certain oxidizing enzymes and on the retention of ascorbic acid in vegetables. Eva R. Hartzler, Ph.D. Penn. State College, 1950. 105 pp., No. 2235. (P.S. 1950, Vol. XIII)

The effect of diet on calcium phosphate deposits in guinea pig tissues. Ting Yao Hsueh, Ph.D. Univ. of Mo., 1949. 96 pp., No. 2322. (M.A. 1951, Vol. XI, No. 2)

The importance of glucose, electrolytes and certain constituents of egg yolk in the diluting medium for the storage of bovine spermatozoa. Ralph Fred Kampschmidt, Ph.D. U. of Mo., 1951. 93 pp., No. 2885. (M.A. 1951, Vol. XI, No. 4)

Naturally occurring fat acids and their derivatives. I. Vapor pressure of (A) methyl, ethyl, and butyl esters, (B) ethanoate esters, (C) alcohols derived from fat acids. II. Preparation and physical constants of methyl oleate. Chihchuan Liang, Ph.D. Penn. State College, 1950. 105 pp., No. 2236. (P.S. 1950, Vol. XIII)

Preparation, purification, and physical characterization of the ethylene glycol mono- and diesters of capric acid. Charles S. Nevin, Ph.D. Penn. State College, 1950. 71 pp., No. 2237. (P.S. 1950, Vol. XIII)

Triphenyltetrazolium chloride as a reagent for the investigation of certain dehydrogenases of *escherichia coli* (strain B). Frank M. Singer, Ph.D. Penn. State College, 1950. 84 pp., No. 2238. (P.S. 1950, Vol. XIII)

Cobalt polycythemia in cattle. George Merrill Ward, Ph.D. M.S.C., 1951. 113 pp., No. 2492. (M.A. 1951, Vol. XI, No. 3)

AGRICULTURAL ECONOMY AND RURAL SOCIOLOGY

Agricultural development in the Pittsburgh district. Donald C. Kimmel, Ph.D. Penn. State College, 1950. 297 pp., No. 2239. (P.S. 1950, Vol. XIII)

A description and cost analysis of milk marketing by Pennsylvania producer-distributors, 1947-48. Homer B. Metzger, Ph.D. Penn. State College, 1950. 304 pp., No. 2240. (P.S. 1950, Vol. XIII)

Distributor, producer, and consumer knowledge and opinion of the Pennsylvania milk control commission and its regulatory functions. Homer J. Preston, Ph.D. Penn. State College, 1950. 303 pp., No. 2241. (P.S. 1950, Vol. XIII)

AGRONOMY

Correlation of plant tissue tests of corn, deficiency symptoms and soil analysis on the Jordan fertility plots. Bertran N. Driskell, Ph.D. Penn. State College, 1950. 75 pp., No. 2242. (P.S. 1950, Vol. XIII)

A comparative study of top cross tester parents in maize. Clarence Orval Grogan, Ph.D. U. of Mo., 1951. 123 pp., No. 2882. (M.A. 1951, Vol. XI, No. 4)

The development of anthracnose and virus 15 resistant strains of rainy river navy beans by backcrossing. Ashby Marshall Rhodes, Ph.D. M.S.C., 1951. 71 pp., No. 2709. (M.A. 1951, Vol. XI, No. 4)

The inheritance of leaf marking in red clover (*trifolium pratense* L.) Paul E. Smith, Ph.D. Penn. State College, 1950. 44 pp., No. 2243. (P.S. 1950, Vol. XIII)

The effect of potassium fertilization on the potassium, calcium, and sodium content of Pennsylvania cigar leaf tobacco. Tien-Chieh Tso, Ph.D. Penn. State College, 1950. (P.S. 1950, Vol. XIII)

Irrigation and compaction on established fairway turf. James R. Watson, Ph.D. Penn. State College, 1950. 113 pp., No. 2245. (P.S. 1950, Vol. XIII)

ANATOMY

Localization of an experimental hypothalamic and midbrain syndrome simulating sleep. Emma Cora Hafer, Ph.D. Univ. of Mich., 1951. 63 pp., No. 2409. (M.A. 1951, Vol. XI, No. 2)

An anatomical and experimental study of temporal and occipital association areas. Lloyd Jean Lemmen, Ph.D. Univ. of Mich., 1951. 63 pp., No. 2410. (M.A. 1951, Vol. XI, No. 2)

ANIMAL HUSBANDRY

Genetic and environmental contributions to the economic characteristics of the Michigan State College dairy herd. Beerappa Chandrashaker, Ph.D. M.S.C., 1951. 209 pp., No. 2703. (M.A. 1951, Vol. XI, No. 4)

The effects of environmental temperature and relative humidity on the acclimation of cattle in the tropics. Carlos Gaztambide-Arrillaga, Ph.D. Penn. State College, 1950. 66 pp., No. 2246. (P.S. 1950, Vol. XIII)

Influence of heterosis and plane of nutrition on rate and economy of gains, digestion and carcass composition of pigs. Keith Edward Gregory, Ph.D. U. of Mo., 1951. 106 pp., No. 2881. (M.A. 1951, Vol. XI, No. 4)

ANIMAL NUTRITION

A study of some factors affecting the ascorbic acid requirement of the Guinea pig. William Harvey Pfander, Ph.D. U. of Ill., 1951. 68 pp., No. 2739. (M.A. 1951, Vol. XI, No. 4)

ANTHROPOLOGY

The reconciliation of divergent views of Hopi culture through the analysis of life-history material. David Friend Aberle, Ph.D. Columbia Univ., 1950. 440 pp., No. 2100. (M.A. 1951, Vol. XI, No. 1)

A study of Cheyenne culture history, with special reference to the northern Cheyenne. Robert Anderson, Ph.D. U. of Mich., 1951. 301 pp., No. 2568. (M.A. 1951, Vol. XI, No. 3)

Comanche linguistic acculturation: a study in ethnolinguistics. Joseph Bartholomew Casagrande, Ph.D. Columbia Univ., 1951. 142 pp., No. 2800. (M.A. 1951, Vol. XI, No. 4)

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